Coal Age

MARCH, 1953

A McGRAW-HILL PUBLICATION—PRICE 50c

Faster Strip Drill

New dry-type rotary unit cuts manpower 79%, speeds bank work for Maumee Collieries. p 80

Skill Gets 24.7 TpM

How changes in equipment and methods boosted output over one-third at Tennessee Coal's deep mine. p 88

Full Contents on p 5

ARE YOU GAMBLING "ALL OR NOTHING" ON YOUR COAL HAULING SYSTEM?

WHY risk shutting down your entire coal hauling system, when you can eliminate this danger with A.C.F. 'Constant Haulage' Mine Cars? When a mine car is out for repairs, the rest of the trip continues on. In most cases a mine car can be repaired quickly and cheaply by your own maintenance men. In addition timber, men and supplies are hauled into the mine on the same transportation system that takes coal out.

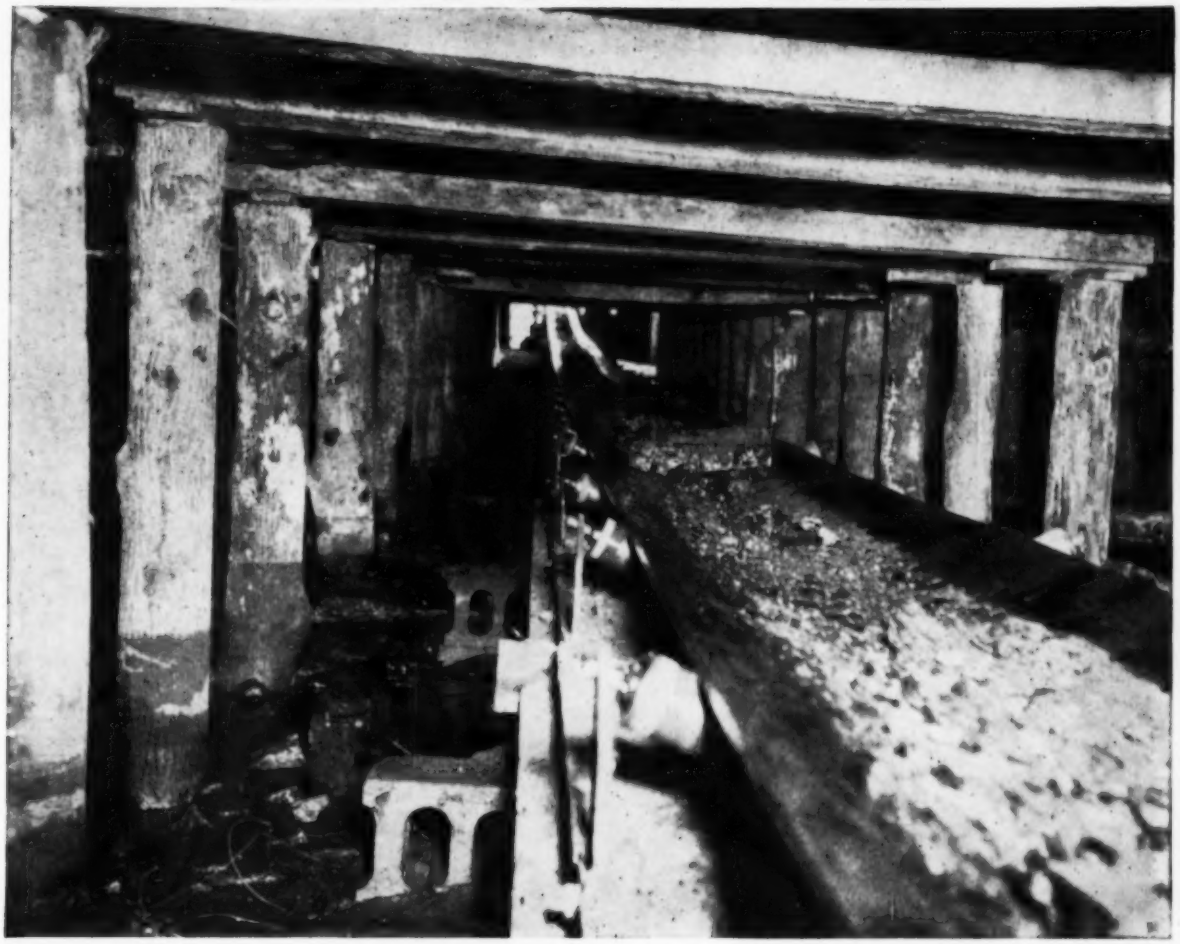
If you are planning a new haulage system or overhauling an old one, look into the *two* big advantages of A.C.F. 'Constant Haulage' mine cars: *1.* They eliminate the danger of complete breakdowns. *2.* They move men and supplies into the mine on the same cars that take coal out. American Car and Foundry Company, New York · Chicago · St. Louis · Philadelphia · Washington · Cleveland · San Francisco Huntington, W. Va. · Berwick, Pa.

a.C.f.

MINE CARS

for Constant Haulage

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



B. F. Goodrich cord belt gives double protection against mildew

MILDEW is a belt killer, especially in coal mines. With most conveyor belts there's nothing to keep moisture from seeping through cover cuts and wicking across the absorbent plies of fabric in the carcass. The belt fabric rots, the belt fails prematurely. There are two reasons why this can't happen to a Caricoal *cord* belt, made by B. F. Goodrich.

Cords sealed in rubber

In this exclusive B. F. Goodrich design, there's a ply of parallel cords, running lengthwise, built into both the top and bottom of the belt. Each cord is completely surrounded by rubber—no cross threads tie them together. A cut in belt admits moisture or damaging acid to only those few cords exposed. There are no cross cords to wick moisture across belt width.

Mildew inhibitors prevent rotting

As an added protection, Caricoal belts are treated with mildew inhibitors. These chemicals act directly on fungus spores, effectively inhibit belts against attack from mildew.

Cord belt at work

Mildew resistance is important in the mine where this picture was taken. That's why the owners selected the Caricoal belt with cord construction. There's been absolutely no sign of mildew and the belt looks good for years' more service.

If exposure to moisture and mine acids is shortening the life of your coal-handling belts, you need a Caricoal cord belt. Let your BFG distributor show you how these longer-lasting conveyor belts can save you money. *The B. F. Goodrich Company, Industrial & General Products Division, Akron, O.*

Caricoal Conveyor Belts

BY

B.F.Goodrich

RUBBER FOR INDUSTRY

Only Specialized Skill

Out on the logs goes the quick-footed lumberjack to work the "jam" loose. One misstep and he's down in the rushing stream, liable to be caught and crushed . . . only specialized skill protects his life.

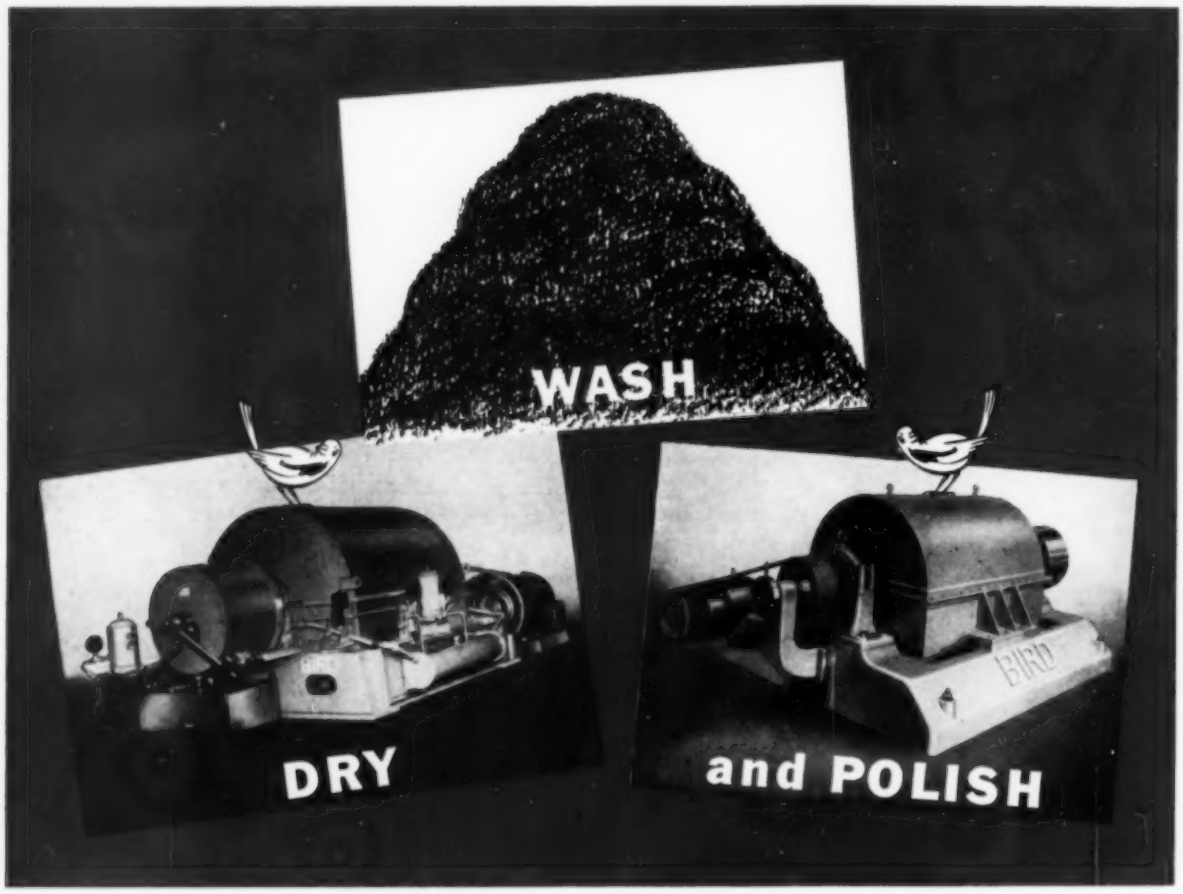
HULBURT OIL & GREASE CO.
Specialists in Coal Mine Lubrication
PHILADELPHIA, PA.

makes possible his performance

– and the same applies to Coal Mining Machinery

Hulburt Quality GREASE

Are you "in a jam" as regards poor production-records logged by your coal mining machinery? Work loose from that condition quick! Use Hulburt Quality Grease. This grease is a product of SPECIALIZED SKILL in the field of lubrication—its one purpose is to protect the life of coal mining machinery—and man, how it DOES just that!



After you've washed your fine coal, these are the BIRDs to dry the coal and polish up the cleaning water.

Bird Coal Filters are built in several sizes, the largest taking a ton or more a minute of ¼ x 0. They get the coal dry enough for direct loading or for lowest cost thermal drying. They do the job at one-third the cost of obtaining equal dryness by any other means. Operation and maintenance (including power, labor and amortization) comes to seven cents or less per ton.

Bird Polishers take the extremely fine (minus 325 mesh), high ash slimes out of the coal cleaning water and make it *closed circuit clean.* Used with a simple clarifying system these undesirable, slimy fines are delivered to a refuse belt and the water is clear enough for continuous recirculation. No waste; no pollution problems.

For specific application information on the Bird Coal Filter and the Bird Polisher, just get in touch with

BIRD MACHINE COMPANY
SOUTH WALPOLE • MASSACHUSETTS

Coal Age

MARCH • 1953

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Residual or Atomic?

LAST MONTH we promised you a feature on the prospects for atom power in this issue. Instead, you will find an analysis of foreign residual oil imports and what they mean to the coal industry and to the Nation. The residual situation is critical and coal is now engaged in a campaign to see what can be done to prevent loss of markets and jobs through dumping on the East Coast. We felt that the facts and suggestions for a plan of action were vitally needed now. Hence the substitution . . . but we'll bring you the atomic-power story prospects in April.

ALSO COMING IN COAL AGE

Efficiency and low cost will continue as *Coal Age's* major gage of material in the future—as in the past. In line with that policy, April and subsequent issues will carry such articles as the following:

How to get the most out of your rubber, whether tires or conveyor belts. From the tire angle, *Coal Age* will report on how the stripping subsidiaries of the Philadelphia & Reading Coal & Iron Co. handle the problems of inspection, repair and service life involved in using almost a million dollars worth of tires. The tips are practical and down-to-earth. Also practical and down-to-earth are the tips on getting your money's worth out of your investment in conveyor belting—by a specialist in belting with many years of experience.

What positive steps can you take to raise efficiency and get the most out of deep-mine mechanization? This is a case history of the work done at a major producing property. The results have been a major increase in tons per man—with more yet to come.

Heating screen cloth and what it accomplishes, including how it's done and what it provides in coal savings, screen life and operating labor.

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starring MILTON BERLE,
on television
Tuesday nights.
METROPOLITAN OPERA
radio broadcasts
Saturday afternoons.

TEXACO

TEXACO

LEVEL...

YOU'LL GET BETTER results – smoother operation, lower maintenance costs – when you use *Texaco Regal Oil (R&O)* in the hydraulic mechanisms of your shovels, dump trucks, cutters, loaders and other equipment, above or below ground.

Texaco Regal Oil (R&O) is the turbine-quality oil that tests show has *more than ten times the oxidation resistance* of regular turbine-quality oils. It keeps systems free from sludge, foam and rust. There is a complete line of *Texaco Regal Oils (R&O)* – proper viscosities (without "cutting back") for every hydraulic job.

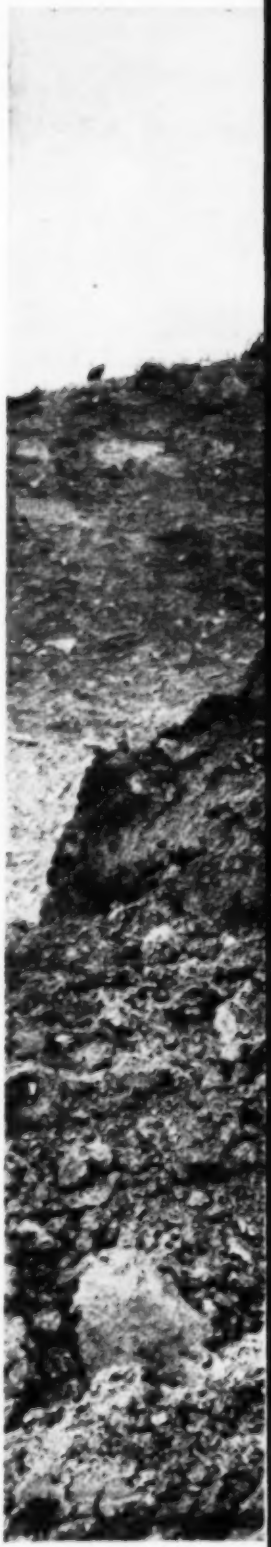
In mine car wheels, use *Texaco Olympian Grease* to assure easier starts winter and summer. It gives longer lasting protection because it *stays in* the bearings – plain, cavity hub or anti-friction. There are three consistencies to meet every requirement.

Let a Texaco Lubrication Engineer help you get greater efficiency and reduce your costs. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

LUBRICANTS for the Coal Mining Industry

WE say the Allis-Chalmers HD-20 is designed to OUTPRODUCE, built to OUTLAST



But anyone can make claims . . . That's why we invite you to get the facts firsthand from HD-20 owners. Just call your nearby Allis-Chalmers dealer. He'll be glad to tell you where you can see these great tractors at work . . . where you can talk to the men who own or operate them. When you do, experience tells us you'll hear about these big benefits:

Hydraulic torque converter drive gives the operator the equivalent of hundreds of gear ratios in two speed ranges — automatically selects the proper speed for maximum production. With hydraulic torque converter drive, you take full advantage of available horsepower . . . even at creeping speed. And cushioned protection means fewer repairs . . . longer life of tractor and auxiliary equipment.

In dozing, pushing or shovel work, there's nothing like the HD-20 for sheer productive power. Torque converter actually multiplies torque up to four and one-half times . . . develops tremendous drawbar pull to start the load smoothly, and automatically accelerates to highest speed conditions permit, in either high or low range.

New design, new performance. The HD-20 is built to take it— with such design advantages as all-steel welded construction . . . balanced weight and power . . . extra heavy main frame. Hydraulic control permits steering this 20-ton giant with only the touch of a finger.

Easy to service, easy to maintain. 1,000-hour lubrication intervals for truck wheels, idlers, support rollers; no lubrication fittings under tractor. Major units are easily removed without disturbing adjacent parts; adjustments are simple.

See for yourself the many profit-making applications of the HD-20. Ask your Allis-Chalmers dealer to show you this outstanding tractor at work.

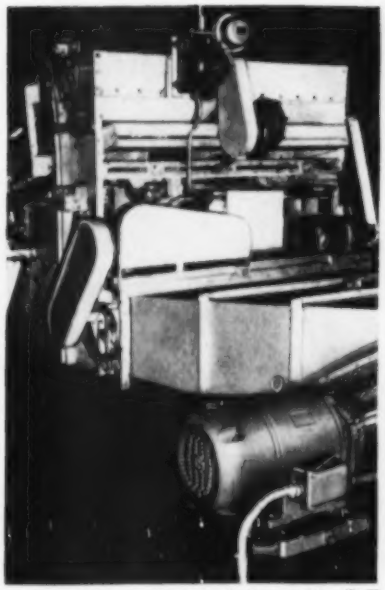
ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

41,000 POUNDS
175 NET ENGINE HORSEPOWER
GM 2-CYCLE DIESEL ENGINE

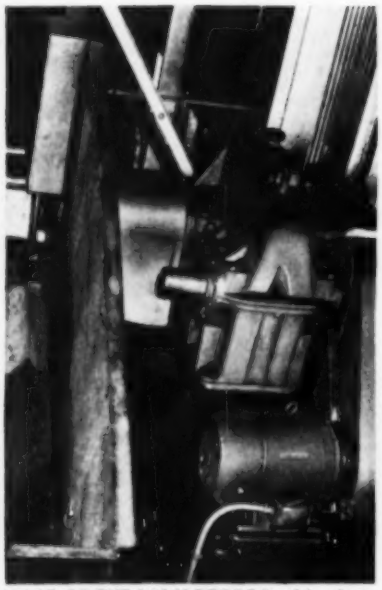
ENGINEERING REPORTS:

CENTRALIZED CONTROL of plant motors at Crown Mine's new preparation plant co-ordinates processing, saves steps, uses manpower most efficiently. This control desk, one of three in the plant, controls the operation of the loading booms.

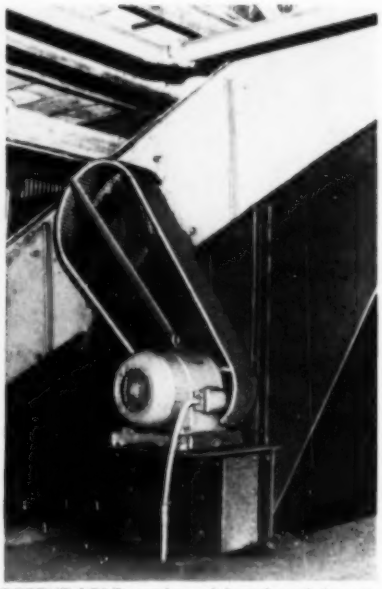
New coal plant cuts downtime



PROTECTED against coal dust, this G-E totally enclosed fan-cooled motor drives an air-flow cleaner in the prep plant.

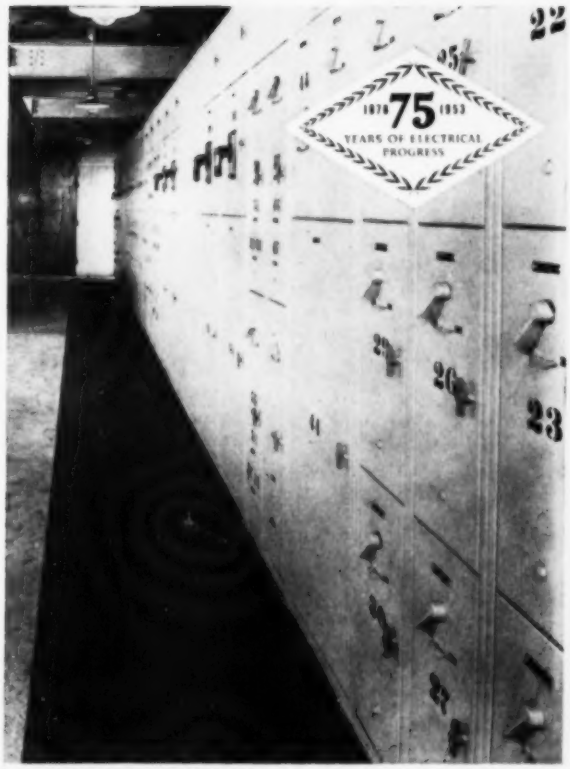


MOST OF THE 146 MOTORS in this plant, like this one driving a crusher, are G-E totally enclosed fan-cooled motors.



DEPENDABLE service with only minimum maintenance is typical of G-E motors, like this one driving an ROM apron feeder.

CO-ORDINATED CONTROL SWITCHES are combined with indicating lights in this panel benchboard on the jig floor.



SEQUENCE OPERATION of plant motors is obtained through interlocks and timers in this G-E Cabinetrol assembly.

with co-ordinated G-E drives

Crown Mine uses G-E motors and control system-engineered to meet plant's needs

Freeman Coal Corporation's new Crown Mine preparation plant at Farmersville, Illinois, is a fine example of the way General Electric co-ordinates motors and control into a smooth-working system to maintain consistently high output at low cost. From self-dumping skips for ROM coal to automatic loading booms for clean coal, G-E system-engineered drives keep processing in step, minimize downtime, make most efficient use of manpower.

You, too, can profit by putting G-E engineering leadership to work on your preparation-plant problems. For more information, contact your local G-E Apparatus Sales Office, or write for Bulletin GEA-5308, "Electrified Coal Preparation," to General Electric Co., Section 663-31, Schenectady 5, N. Y.

LOADING BOOMS discharging into railroad cars are controlled from boom operator's cab (upper left). Sequence control utilizing G-E Cabinetrol co-ordinates conveyor operation.

Engineered Electrical Systems for Coal Preparation Plants

GENERAL ELECTRIC

TIREX Welding Cable means More Efficiency

for

THREE GOOD REASONS

1 **Excellent Flexibility:** TIREX Welding Cables have a single conductor composed of many hundreds of specially-twisted copper strands. The twisted copper strands give exceptional flexibility that lessens drag and wrist fatigue. TIREX Welding Cables will not snarl or kink.

2 **Strips Clean:** Between conductor and jacket a specially selected paper separator is used to assure clean, fast stripping.

3 **Longer-Life:** The famous neoprene armor is **cured in lead.** This means extra protection against tear and abrasion. TIREX Welding Cables offer excellent resistance to damage by oil, chemicals, moisture, and flame.

These are the features that can mean greater production, more finished work, and lower operating costs on all your electrical welding jobs. TIREX Welding Cables come in sizes ranging from No. 8 A.W.G. with 420 strands, to 1,000,000 C.M. with 25,270 strands. For more complete information on your specific welding problem call your nearest Simplex representative or write to us in care of the address below.

SIMPLEX-TIREX

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.

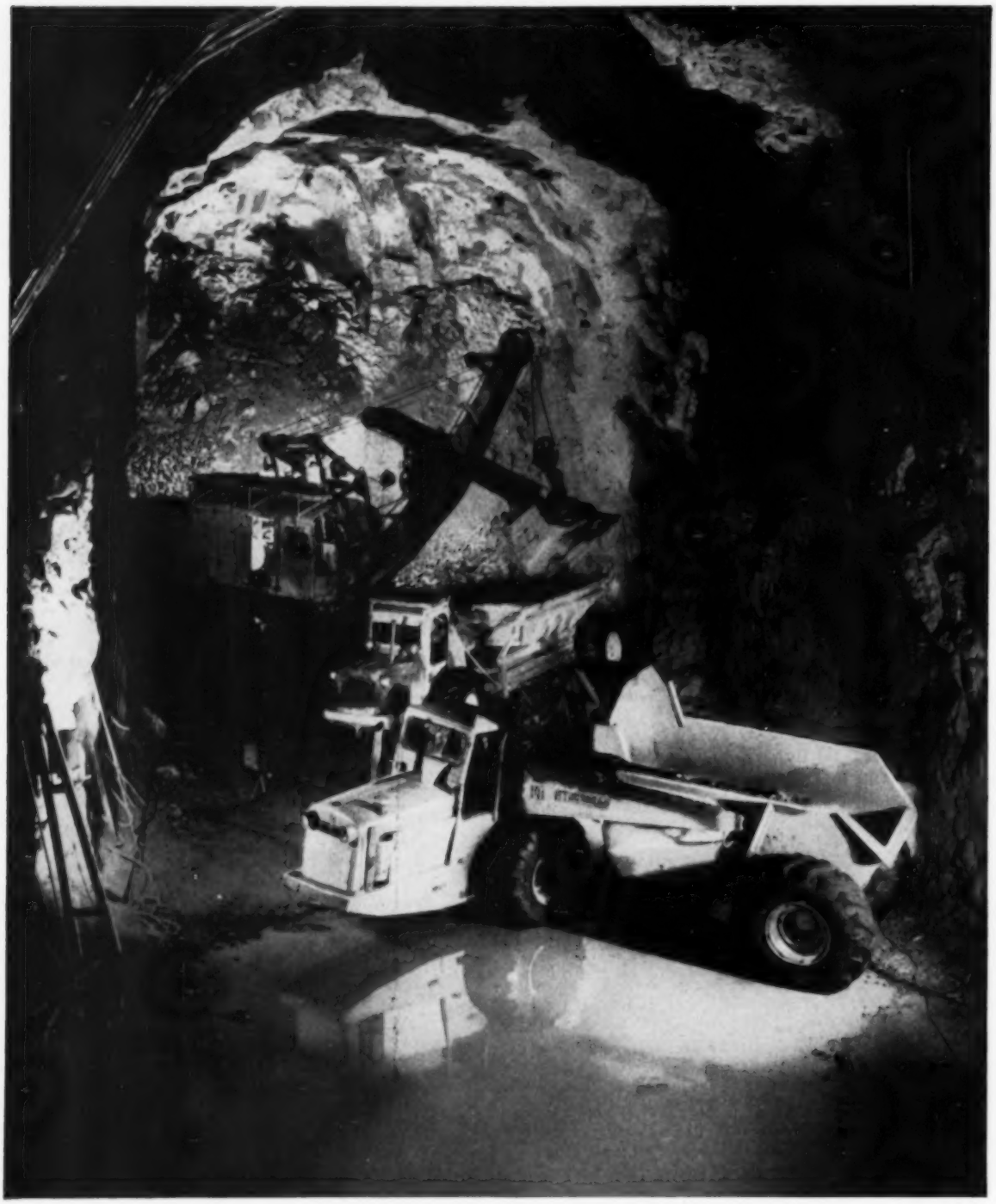
LeTourneau pictures of the month . . .

MINES IRON AT 30° BELOW — 215 miles north of the Arctic Circle at Kirkenes, Norway, 2 C Tournatractors work 24 hours a day, 365 days per year. Their task, vital to the Norwegian defense effort, includes shovel clean-up and haul road maintenance in one of the largest open magnetite pits in Scandinavia. Some 2,300,000 tons of ore are being removed annually The pit is 350 ft deep. Despite the grades, subzero arctic weather and abrasive material, Tournatractor efficiency has been very high. Rig's tires have required no repair. Greasing, required only once every 10 shifts, can be done in about 15 minutes. Overall maintenance needs are low. Equipment owner is Sydvaranger A/S of Oslo, leading European contracting firm.

CARRIES 50 TONS PER LOAD — Here hard at work in the Pennsylvania anthracite fields is one of Colitz Coal Co.'s three 50-ton Tournarockers. Behind a 450 hp butane engine, these rigs carry 41 pay yards per load. They are 36 ft long overall, yet turn in a radius of 15 ft 8 in. With Tournarockers, you can forget many of your old rear-dump troubles. These rigs have no frame, sub-frame, springs, tie rods, or hydraulics. Electric push-buttons control steer, dump, shift.

See next page

LeTourneau pictures of the month (cont'd) . . .



DIG 2.9-MILE TUNNEL THROUGH SOLID ROCK

These rigs are not toys. That's a 2¼-yd shovel, loading one of six 18-ton LeTourneau haul units used on this job. They are digging a sloping 2.9-mile-long, 40-ft high tunnel through tough, sharply-fragmented gneiss-type rock to connect two lakes in Sweden. The fall of water through the tunnel from one lake to the other will provide electrical power. Tunnel is only 36 ft wide, yet Tournarockers turn around easily in one continuous sweep. Loads average 18 tons each. Production averages 36 tons hourly over typical 2¼-mile cycles. Digging is so tough that only 20 lineal ft of tunnel is opened per day. "In spite of severe conditions, repair and maintenance costs have been very low," says S. Westby, chief engineer on the 785,000-yd project, one of the largest ever contracted in Sweden. "Tournarocker's greatest advantage is its maneuverability and short 13 ft 9 in. turning radius."

Performance reports on LeT equipment in action

HUNTS OIL IN 150° HEAT — 250 miles from the nearest oasis, this Tournadozer is really getting a rough workout. Used by the Iraq Petroleum Co. exploration crews in eastern Arabia, it prepares drill locations, levels camp sites, and builds haul roads. Rig works 10 to 18 hrs a day in temperatures which hit 150° in the daytime, then drop to 35° at night. Material is mostly desert sand with occasional outcroppings of coral and sandstone. Only servicing required in the past year has been routine weekly inspections.

MINES SHALE IN TEXAS — By mining 250 tons of slacked shale daily with their self-loading D Tournapull, Acme Brick Co., Fort Worth, Tex., cut man-hour requirements 75%. Single "D" replaces a dump-truck and front-end loader. It handles in 4¼ hrs the same job that formerly took 17 man-hrs to complete. "D" self-loads 5 bank yds of shale, hauls 0.4 mile to crusher bin, dumps and returns to pit in 4.5 min. Performance here led to purchase of 3 more units for other Acme pits in Malvern, Ark, Clinton, Okla, and Baton Rouge, La.

DRIVES 755 MI IN 34 HRS — Rogelio Viesca, Mexico City contractor, recently took his rubber-tired Tournapulls on a long journey. Rigs drove over paved highways, through cities and towns, and across 8,000-ft mountains to reach Mexico City from Laredo, Texas. They made the 755-mi trip in 34 hrs, total driving time (an average of 22 miles an hour) . . . went to work on construction of a new spur line for Pemex Oil Co. the day they arrived at the job site.

WORKS UNDER WATER — Tournapull wades across 5-ft river on the way from Panama City to Pan American Highway job near David on the Costa Rican border. Though water covered generator, rig's electric controls were not affected, reports Owners Vallarino & Arias. That's nothing unusual, though. Water never stops the LeTourneau electric motors or generator. One motor, operated underwater for 4 yrs as a test, still runs as well as ever.

See next page

LeTourneau pictures of the month (cont'd.) . . .

6000 HRS, 90% EFFICIENT — All feeding for this portable asphalt plant, run by Miss. State Highway Dept at Hattiesburg, is handled by Tournatractor. Plant output averages 770 tons per 9-hr day. After 3½ yrs (over 6,000 hrs) work in sand and gravel, rig has been 90% efficient . . . still has original tires. "Haven't had a minute's trouble with them," says Plant Supt Grady McCardle. Tracks would have needed at least 5 or 6 complete overhauls during same period.

7 JOBS IN 10 HRS — In Minn the Coons Co. handles scattered jobs with Tournatractor. In a typical 10-hr shift, rig maintains 2 overburden dumps, stockpiles lean ore, cleans up for 3 shovels, maintains haul roads.

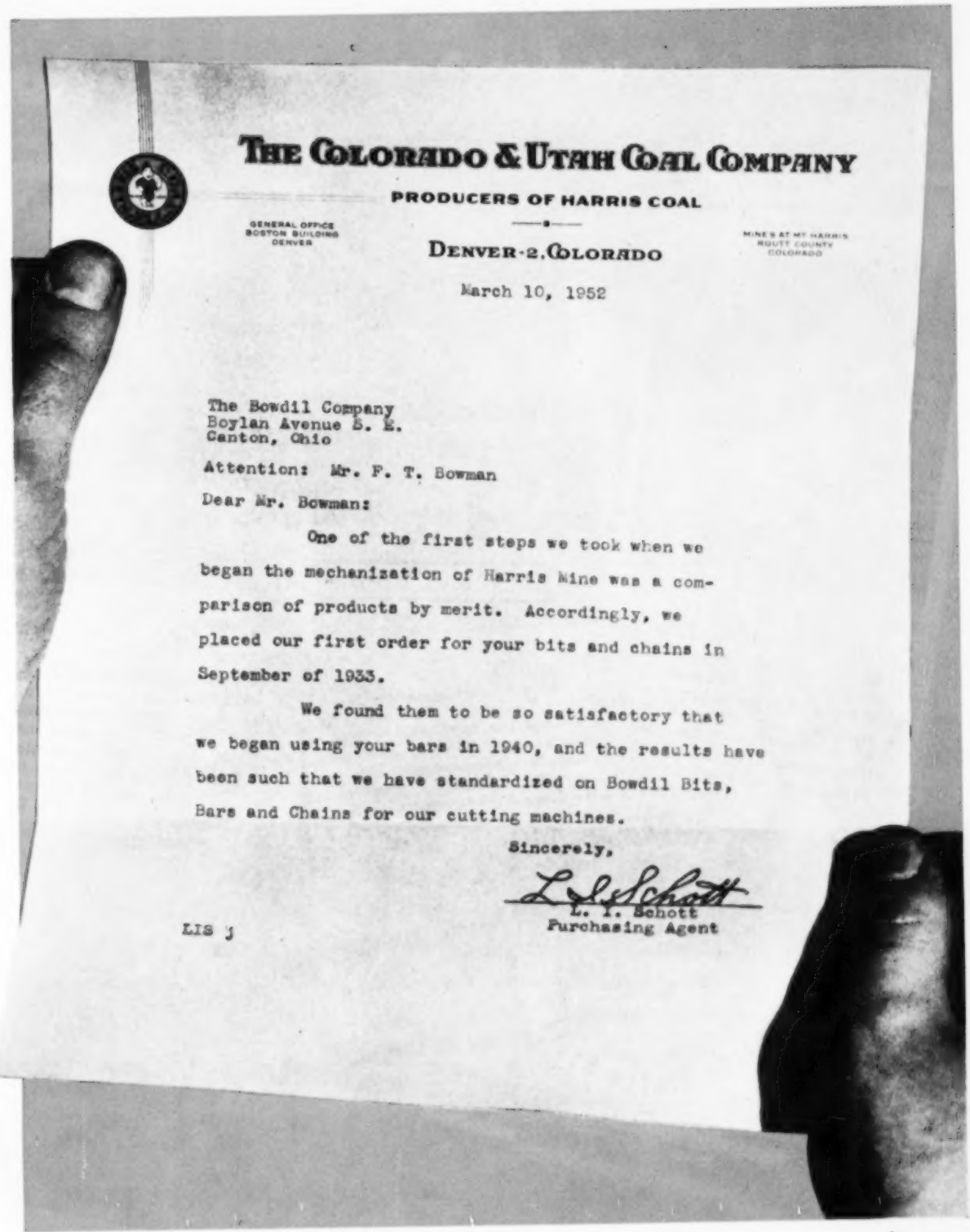
BEATS WINTER SHUTDOWN — Frank Whitcomb works his 2 rear-dump Tournarockers 12 months a year. In New Hampshire, where he does most of his work, temperatures often drop well below zero. But no matter how cold it gets, Tournarockers dump any material that can be loaded. Electrical induction body heating keeps loads from freezing. When unheated trucks have to be used under similar cold weather conditions, they must be cleaned out by a small pull shovel.

3½-MINUTE MILE — Lehigh Portland Cement Co, Albany, NY, uses this D Tournarocker to haul waste. Unit loads 12 yds, hauls 1 mi to dump in 3½ min. With front-wheel drive, Tournarocker backs safely to edge, dumps clear over bank. Saves expensive cleanup.

"VERY FAST AROUND A SHOVEL" — Stripping year-round for Diamond Portland Cement Co, Ohio, Tournatractor breaks up and dozes 15 to 18" of shale to shovel. As needed for cleanup, machine runs 3 miles to plant or drives into pit for shovel service. Operator Elon Gallineau says, "This machine is dynamite!" Plant Mgr E. R. Evans says, "Rig will move as much shale in half a day as our crawler can in a full day."

R. G. LeTOURNEAU, INC., PEORIA, ILL.

Tournatractor—Trademark Tournarocker, Tournapull—Trademark Reg. U. S. Pat. Off. Pic. 310-M



THE COLORADO & UTAH COAL COMPANY

PRODUCERS OF HARRIS COAL

GENERAL OFFICE
BOSTON BUILDING
DENVER

DENVER-2, COLORADO

MINES AT MT. HARRIS
ROUTT COUNTY
COLORADO

March 10, 1952

The Bowdil Company
Boylan Avenue S. E.
Canton, Ohio

Attention: Mr. F. T. Bowman

Dear Mr. Bowman:

One of the first steps we took when we began the mechanization of Harris Mine was a comparison of products by merit. Accordingly, we placed our first order for your bits and chains in September of 1933.

We found them to be so satisfactory that we began using your bars in 1940, and the results have been such that we have standardized on Bowdil Bits, Bars and Chains for our cutting machines.

Sincerely,

L. F. Schott
Purchasing Agent

LIS j

SALES ENGINEERS IN — Whitesburg, Kentucky — West Frankfort, Illinois
Charleroi, Pennsylvania — Denver, Colorado — Big Stone Gap, Virginia
Danville, West Virginia — Canton, Ohio — Birmingham, Alabama
Helper, Utah — Kansas City, Missouri — Centerville, Iowa — Topeka, Kansas
New Castle, England — Alberta, Canada

BOWDIL
COAL CUTTING EQUIPMENT
CANTON OHIO

Look what you can do

Soak it in Acid Water

It won't penetrate the live Neoprene cover. This jacket does more than keep water out; it will not swell and deteriorate when exposed to oil and grease.

Drag it over rock–

The tough cover will take abuse like an elephant's hide. Amerclad cables are famous for their abrasion resistance. They can be dragged over sharp rock and rough floors without damage.

Flex it–

Amerclad Welding cables are made from extra-fine strands to eliminate strain on the operator's wrists. This also allows the cable to be easily snaked into restricted quarters.

AMERICAN STEEL & WIRE DIVISION
USS TRADE MARK
AMERICAN ELECTRICAL WIRE AND CABLE
UNITED STATES STEEL

with AMERCLAD:

Reel it in or out-

Mine operators like the way Amerclad stands up under the continuous reeling necessary on so many mine machines. Here, the cable is reeled in and out—all day long—on a minimum diameter pulley.

Expose it to sunshine-

Amerclad cables are designed to give top service even when exposed to sunshine, ozone, oil or grease. This chemical protection, combined with the mechanical strength of Amerclad, assures you of long life even under the most punishing conditions.

Hang it over cliffs-

Amerclad has the strength to resist abrasion. Even though it sways in the wind and grinds against rock particles, the tough Neoprene jacket will bounce back for more.

WRITE FOR INFORMATION. There is an Amerclad cable or cord to meet your exact needs. Amerclad cables are designed for specific uses on portable machinery, tools, motor and generator leads, welders, machine tools, appliances, mining machinery—wherever you need a heavy-duty cable that will give long life and freedom from trouble.

Get in touch with your nearest AS&W office or write: American Steel & Wire Division, Rockefeller Building, Cleveland 13, O.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION, GENERAL OFFICES: CLEVELAND, OHIO

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS

TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

U·S·S American Electrical Wire and Cable

UNITED STATES STEEL

Why this special mine jack will give longer, trouble-free service

When Duff-Norton engineers set out to design safer, longer lasting jacks for men who work in and around coal mines, they discovered one startling fact—about 90% of jack maintenance was in replacing worn springs in the mechanism that controls the jack's raising or lowering action. Result? All Duff-Norton mining jacks are equipped with a patented, adjustable spring mechanism which assures positive engagement of rack teeth. The spring's tension can be easily adjusted with a screw driver without removing any part of the jack. Should the spring eventually lose its resiliency, there's no need to send the jack to the repair shop. A new, complete spring mechanism assembly can be quickly installed by anyone in a matter of minutes, making the jack as good as new! In fact, as a special service, Duff-Norton distributors carry in stock extra spring mechanisms for all Duff-Norton ratchet lowering jacks.

Ask your local distributor or write the world's oldest and largest manufacturers of lifting jacks for a copy of "*A Handy Guide for Selecting Duff-Norton Mine Jacks.*" This colorful, illustrated booklet is full of useful information about all kinds of jacks for coal men. Ask for bulletin AD10-J, The Duff-Norton Manufacturing Co., P.O. Box 1889. Pittsburgh 30, Pa.

The No. 516 MT for medium seam mines is 16 inches high when closed, can raise 5 tons up to 9½ inches.

DUFF-NORTON Jacks

"Giving Industry A Lift Since 1883"

The CONTINUOUS MINER

Gives You Advantages that Protect and Increase Your PROFIT MARGIN

- ★ Maximum Total Recovery
- ★ Favorable Size Consist
- ★ Stay-on-the-Job Toughness
- ★ Rock-bottom Cost per Ton

The benefit that Joy Miners can bring you is not fancy, but fact—*proved in the field* by scores of JCM units working in every producing area and under all conditions from thin to full-seam mining.

Joy Continuous Miners are fast, tough and flexible. They're built to stand up . . . and to do every job you ask of them—from the original development work to taking pillar—at the absolute minimum cost per ton. Total recovery of 80% or better is common, and in some cases exceeds 90%. Why not look into it? Our engineers are at your command, any time! ● ***Joy Manufacturing Company, Oliver Bldg., Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

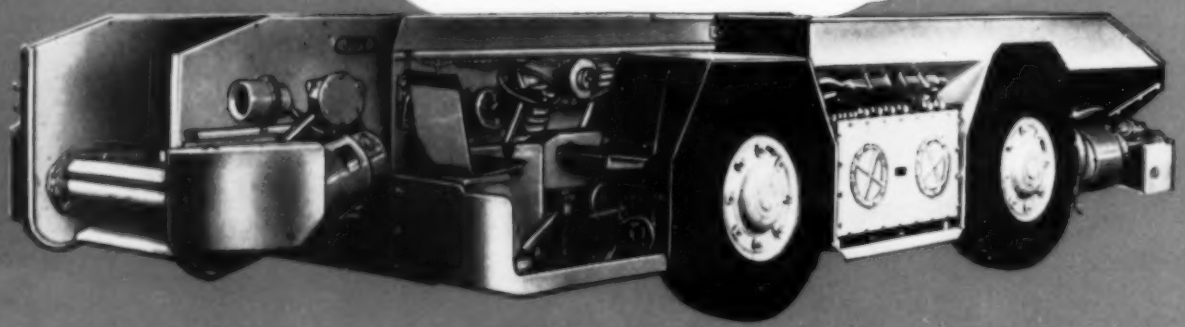
Consult a Joy Engineer

JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

THE JOY 10-SC SHUTTLE CAR...

1953 MODEL!



The improved Joy 10-SC Shuttle Car is available as a Permissible or Non-Permissible unit, for net payload capacities up to 10 tons. It is built in 43", 48" or 54" heights (machine only) and may be equipped with 4", 6" or 8" sideboards. Tramming speed loaded is approximately 4½ m.p.h., and the unit is equipped with Joy-pioneered hydraulic cable reel, and hydraulically adjustable elevating discharge.

CAN MAKE MONEY FOR YOU!

It gets from the Face to the Discharge Point and back again faster than any other car on the market

This latest model 10-SC is away out in front—more than ever before the world's leading shuttle car for heavy-duty, high-production service. Particularly ideal for full-seam mining because it can handle full loads of coal or rock with equal ease, the 10-SC Shuttle Car is now capable of new potentials in productivity, maneuverability, and dependable performance with lowest maintenance.

MORE ROUND TRIPS PER SHIFT

The 1953-model 10-SC can travel, discharge and return faster than any other car in its class. That means more pay-loads per shift—and it may also mean more efficient use of other equipment, such as Continuous Miners, Loaders, Belt Conveyors, etc.

15 HP traction motors of new design provide more dependability and more reserve power for increased speed, maneuverability and carrying capacity. Wheel units and brakes are of over-capacity size for continuous heavy-duty service, and the gearing and frame are also over-capacity. Higher speed conveyor discharge, with higher-HP motors, actually gets discharge time down to three-quarters or half the time formerly required.

OTHER JOY-PIONEERED FEATURES

The 1953-model 10-SC Shuttle Car has 4-wheel positive steering, 4-wheel drive and 4-wheel brakes. The hydraulic "power steering" innovation in the automotive world has been a standard patented feature of Joy Shuttle Cars for years . . . one of the reasons for their high maneuverability.

The 10-SC's smooth, grab-free disc-type brakes (the type widely used on aircraft) were also pioneered by Joy for underground use. They provide exceptional stopping power with extreme simplicity and low maintenance . . . ideal for mining use because they're unaffected by dirt, coal dust, oil or water.

Other features of the new 10-SC include: improved arrangement of operator's controls for fool-proof driving; improved "zone" lubrication for fast, easy servicing; the famous Joy "Magnetax" controls, etc.

● For full data, address ***Joy Manufacturing Company, Oliver Bldg., Pittsburgh 22, Pa. In Canada:*** *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

Consult a Joy Engineer

JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

Here's your Cost-Saving Cutter for Medium-Low Coal!

The 11-RU UNIVERSAL

does EVERYTHING... and does it BETTER!

Only 31" high for trackless operation in medium low coal, the Joy 11-RU Universal Cutter has the extreme flexibility, speed and maneuverability that keeps your cutting costs in check . . . plus the ruggedness that means day-after-day dependability and low maintenance. Available with the famous Joy Bugduster, if desired . . . and when a Joy Cutter is equipped with Sulmet Bits, you have a combination that has given best results and lowest bit cost per ton in every mining field.

Joy makes a complete line of coal cutters for every mining system, and a range of tungsten carbide bits to meet every seam condition. ● Let us work with you. ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada, *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

Consult a Joy Engineer

JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

BIG LOADS RIDE EASY ON A Mack's BROAD SHOULDERS

It will pay you to find out what Mack six-wheel trucks can do to save money and boost profits on your job through unfaltering traction and faster, uninterrupted schedules.

That's because only Mack six-wheelers boast the unique advantages of Mack's exclusive Balanced Bogie and Power Divider . . . with all the benefits they give you in maximum flexibility, even tire loading, uniform braking, simplicity of design and positive traction regardless of the toughest terrain.

Write to us today for your free copy of booklet describing the Mack Balanced Bogie with Power Divider, or contact your nearest Mack branch or distributor.

Mack TRUCKS

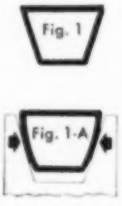
. . . outlast them all

Mack Trucks, Empire State Building, New York 1, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

WHY
Gates V-Belts Wear Longer-

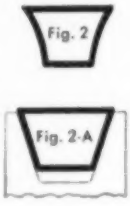
The CONCAVE SIDE (U.S. Patent No. 1813698) is what gives the Extra Wear!

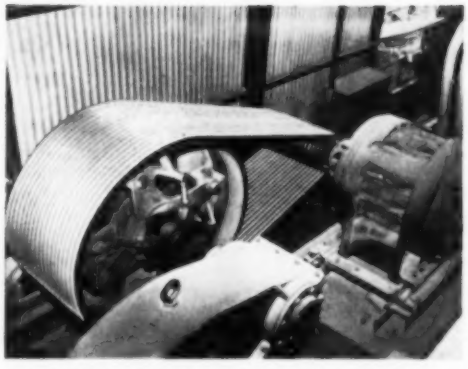
Take any *straight-sided* V-Belt (Fig. 1) and bend it as it bends in going around its pulley. You will clearly see its sides *bulge out* (Fig. 1-A). These sides therefore press *unevenly* against the V-pulley and this causes extra wear at the point shown by arrows (Fig. 1-A).



Now bend a Gates Vulco Rope with CONCAVE SIDES (Fig. 2).

You will see the precisely engineered CONCAVE SIDES fill out to an exact fit in the sheave-groove (Fig. 2-A). The sides press *evenly* against the V-pulley. All wear is distributed *uniformly* across the *full width* of the Gates Vulco Rope—and this means longer belt *life* and *lower* belt *costs* for you.





Typical Gates Vulco Rope Drive—the Gates V-Belts are built with Concave Sides to insure longer belt wear.

When you buy V-Belts, be sure to get the V-Belt with the CONCAVE SIDES—the Gates Vulco Rope!

Gates Engineering Offices and Jobber Stocks are located in all industrial centers of the United States and in 71 foreign countries.

CS-533

V-Belts — Hose
Molded Rubber Goods
for industry
World's Largest Maker
of V-Belts

Gates® VULCO ROPE DRIVES

THE GATES RUBBER COMPANY • DENVER, U.S.A.

"There's only ONE reason!"

IT'S JUST THAT SIMPLE. There's only one reason in the world why 2 out of 3 wire rope users in the mining field prefer Roebling wire rope . . . *it costs a lot less on the job than any other.*

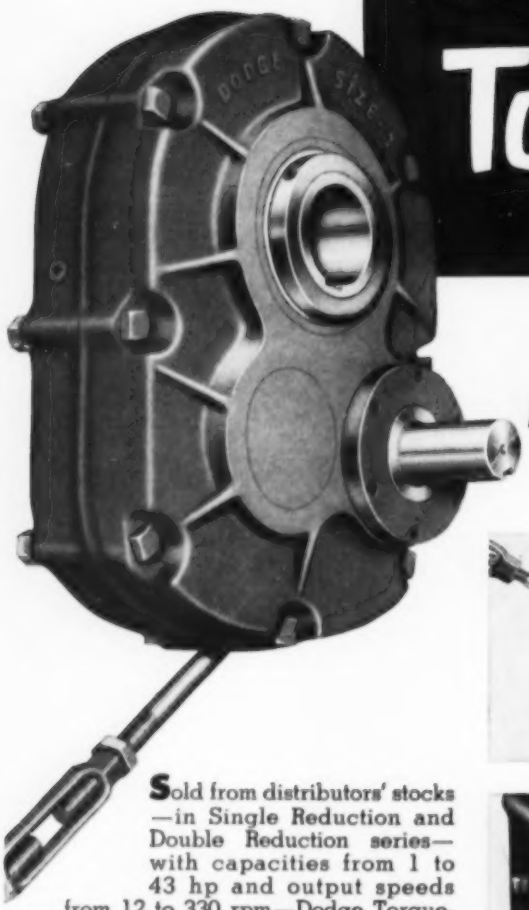
For maximum wire rope efficiency and economy, call your nearest Roebling office for a Field Man. He'll recommend the best ropes for your requirements.

ROEBLING CF&I

A subsidiary of The Colorado Fuel and Iron Corporation

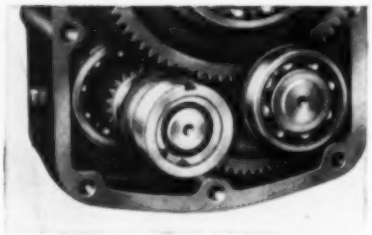
JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

Torque-Arm



The Most Complete Line of Shaft-Mounted Speed Reducers!

TRI-MATIC OVERLOAD RELEASE
Provides instant, positive protection for driven machines, motors and reducer itself. Automatically (1) loosens the belts, (2) cuts off power, (3) gives a warning.



TORQUE-ARM BACK STOP
Available from stock when required. Easily installed—sealed inside reducer housing. Simple, positive action prevents reversal.

Sold from distributors' stocks —in Single Reduction and Double Reduction series—with capacities from 1 to 43 hp and output speeds from 12 to 330 rpm—Dodge Torque-Arm is the new and modern idea in speed reducers.

No special engineering required. No foundation to provide. No flexible couplings. No sliding base. No lining up difficulties. No expensive installation. Stock Taper-Lock sheaves prescribed for each job to provide desired speeds. Application to other machines is practical and easy.

Unit is driven through any V-Belt Drive. Torque-Arm, fastened to any fixed object, anchors the reducer unit. Turnbuckle provides fast and accurate adjustment of belt tension.

Standardize on Torque-Arm, the speed reducer that saves you money.

DODGE MANUFACTURING CORPORATION
3000 UNION STREET, MISHAWAKA, INDIANA

DODGE
of Mishawaka, Ind.

CALL *THE TRANSMISSIONEER*, your local Dodge Distributor. Factory-trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone book.

1878 DODGE 1953 75th ANNIVERSARY

TAPER-LOCK SHEAVES, SEALED LIFE V-BELTS

DODGE-TIMKEN PILLOW BLOCKS

TAPER-LOCK FLEXIBLE COUPLINGS

Put This
Cost Cutting Specialist on Your Haul Roads

Allis-Chalmers Model D

WEIGHT — 8,800 lb.
BRAKE Horsepower 40
SPEEDS — Four forward, to 25.6 mph.; reverse to 3.3

THE Allis-Chalmers Model D Motor Grader offers big-grader design and performance advantages. Like big graders, it has tandem drive wheels to provide real earth-moving traction. It also has a shock resistant tubular frame, high throat and axle clearance, ROLL-AWAY moldboard and power hydraulic controls.

And the Model D has many additional advantages for haul road maintenance. Its low original cost — only a third as much as large graders — its operating economy, size and dependability, make it ideal for this type of work. With the famous Allis-Chalmers 40 hp. gasoline engine, it easily handles all maintenance and light construction jobs. Compactness and short turning radius enable it to work easily in close quarters.

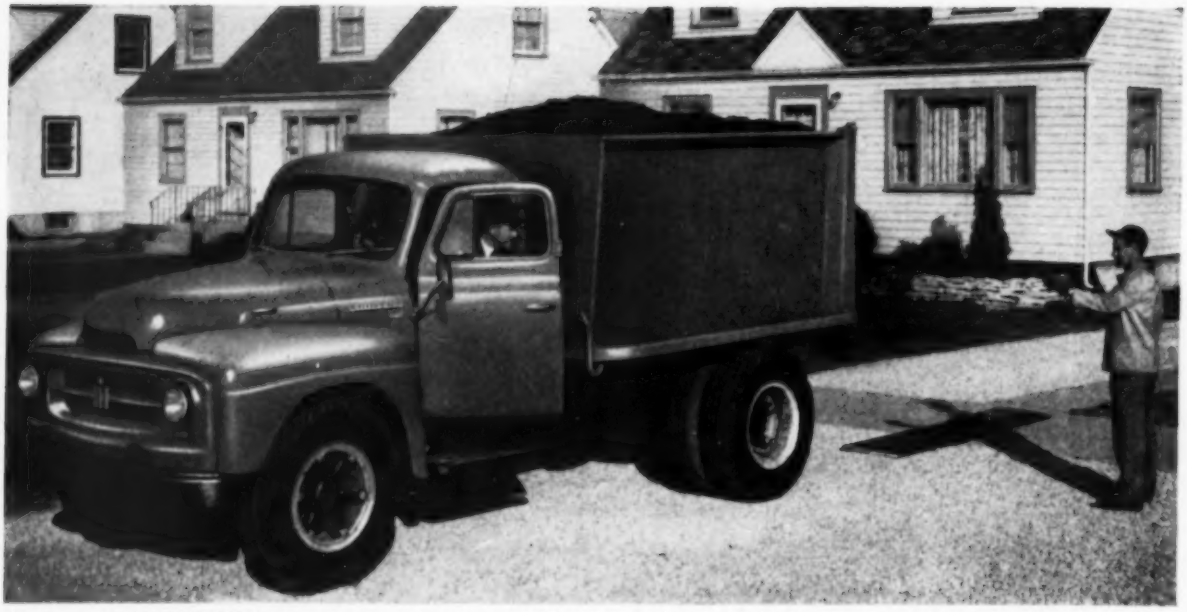
Special attachments — such as the rear-end loader — make it an all-round performer.

See your Allis-Chalmers dealer for all the facts on the low-cost Model D. Start cutting haul road maintenance costs now.

You can count on the Model D to do *more* than maintenance work, for this busy machine has power and traction to handle a good deal of the construction work, too. In addition, its ⅝ cu. yd. bucket loads excess dirt, fills small gullies and ditches . . . handles many other jobs which would ordinarily call for a specialized machine.

ROLL-AWAY is an Allis-Chalmers trademark.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.



New International R-184 LOADSTAR features the new, 130 horsepower, "BLACK DIAMOND 282" engine. 21,500 lbs. GVW rating. 130, 142, 154 and 172-inch wheelbases.

NEW INTERNATIONAL TRUCKS

BUILT as only IH can build them

The 168 basic *New* International models embody the engineering principles, used in International's continuing program of truck research and development, that have resulted in hundreds of exclusive International features that have meant greater profits for truck buyers.

PROVED as only IH can prove them

The 307 features in the *New* International Truck line have been *proved* in the world's most advanced Truck Engineering Laboratory; *proved again* at International Harvester's 4000-acre desert Proving Ground at Phoenix, Arizona.

VALUE only IH can give you

The *New* International Trucks offer an unmatched combination of values—the right truck for the job, unequalled performance, lowest maintenance and operating costs, maximum driver comfort.

Now—the features you want—in America's most complete truck line

New International styling identified by the IH emblem . . . **Exactly the right power** for every job. First truck builder to offer choice of gasoline or LP gas with Underwriters' Laboratories listing in 1½-ton sizes and other models . . . **Designed by drivers for drivers.** Comfo-Vision cab with one-piece Sweepsight windshield. New comfort and interior styling . . . **Steel-flex frames** proved best in the field . . . **Transmissions** to meet any operating requirement . . . **296 Wheelbases** ranging from 102 inches up . . . **Easy starting and greater fuel economy** . . . **Wide range** of axle ratios for all models . . . **Real steering comfort and control** . . . Sizes from ½-ton to 90,000 lbs. GVW rating. Now—See The New IH-Built, IH-Proved International Trucks at your nearest International Dealer or Branch.

INTERNATIONAL HARVESTER COMPANY • CHICAGO

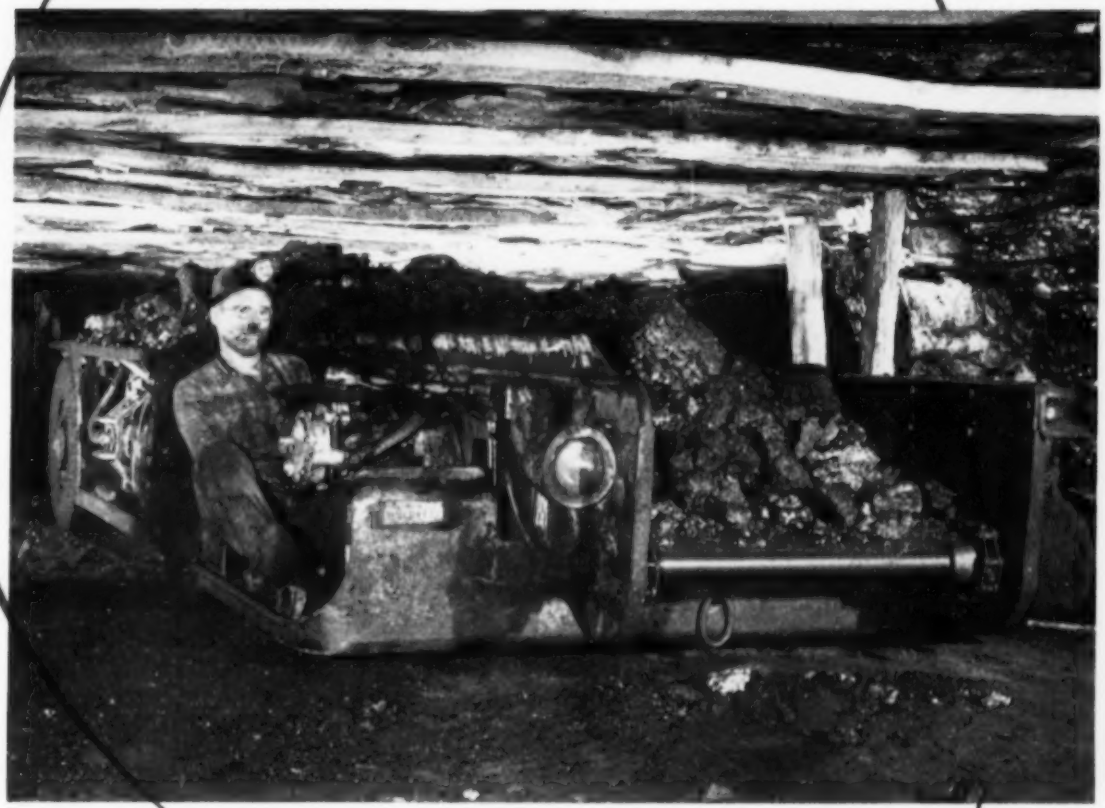
International Harvester Builds McCormick Farm Equipment and Farmall Tractors . . . Motor Trucks . . . Industrial Power . . . Refrigerators and Freezers

Better roads mean a better America

INTERNATIONAL TRUCKS

Standard of the Highway

Heavy Duty Shuttle Cars For Low or High Coal



designed and built by **GOODMAN MANUFACTURING COMPANY CHICAGO**

Features of Goodman shuttle cars that make them acceptable in mines everywhere: U. S. Bureau of Mines approved for use in gassy or dusty mines . . . fixed or adjustable height discharge . . . 4 wheel drive with selective high or low speed . . . 4 wheel, disc type brakes with independent hydraulic system . . . 4 wheel steering with hydraulic booster . . . forced ventilation of controller cases . . . hydraulic driven cable reel.

Goodman BUILDERS OF A COMPLETE LINE OF UNDERGROUND MINING MACHINERY

Again Outstanding DESIGN for New Speed and Economy in Drilling

Parmanco

MODEL 51 • SELF-PROPELLED • HYDRAULIC

COAL AND CLAY DRILL

This Model 51, one-man operated drill, adds another unit to the top performing PARMANCO line of drilling machines.

An example of its great value is seen in its ability to drill 2½-inch holes at a speed up to 7 feet per minute in No. 5 coal. It will also handle 4¼-inch augers up to 25 feet in depth.

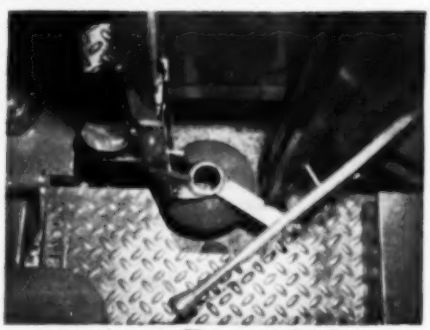
• Hydraulic Feed • Finger-Tip Controlled • Fluid Motor for Auger Rotation

4 Jacks and Power Winch optional at extra cost.

Above

New Automatic CUTTINGS SHIELD and GUIDE

Model 51 is equipped with the newly perfected Automatic Drill-Cuttings Shield and Guide. Now blast holes are kept absolutely clean from cuttings. Note in picture how a dam is formed about the blast hole, excluding casual surface water.

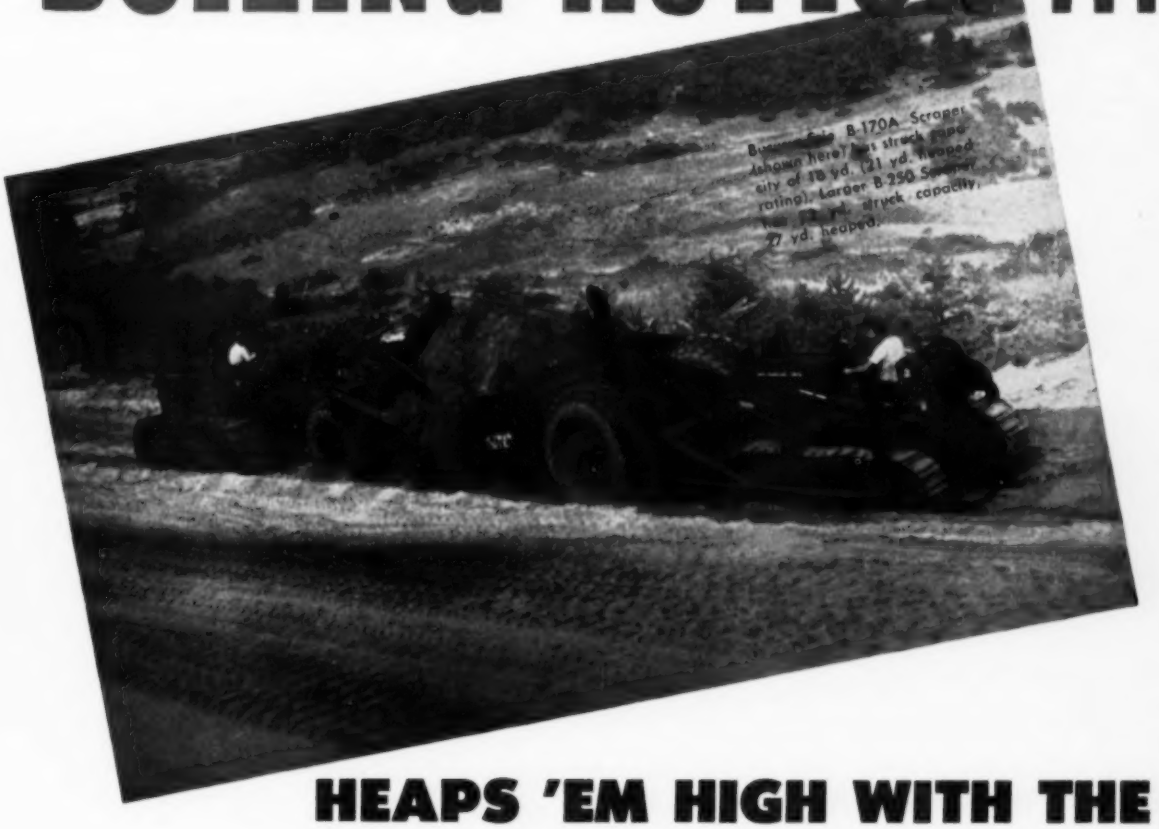


Looking down on New Automatic Drill-Cuttings Shield and Guide located at the right of driver's seat.

Send for Complete Details

PARIS MANUFACTURING COMPANY • PARIS, ILLINOIS

"BOILING ACTION"...



HEAPS 'EM HIGH WITH THE

BIG RED TEAM

YOU'LL get plenty of heaped loads with Bucyrus-Erie B-type Scrapers. Dirt *boils* up into bowl, is broken into small pieces to eliminate voids. You get a smooth, even, compact and *full* load.

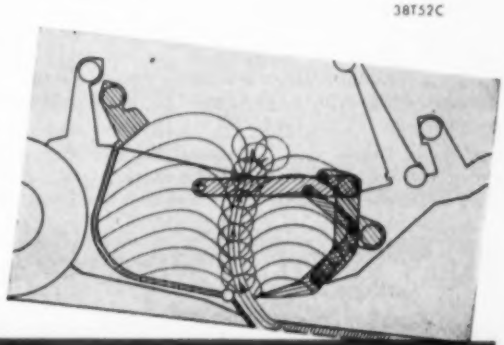
The Big Red Team — combination of Bucyrus-Erie B-type Scraper and International TD-24 tractor — not only loads full but loads fast and in a short distance and has moved more dirt at less cost than competitive units in one field test after another.

See your International Industrial Tractor Distributor for all details on the dirt hauling member of the Big Red Team . . . ask for a demonstration and see for yourself why it's your best bet for really low cost dirt.

"BOILING ACTION"

in B-type Scraper causes dirt to fountain through the load, spreading forward into apron and back into bowl for the heaped loads that mean big production.

38T52C



SOUTH MILWAUKEE BUCYRUS ERIE WISCONSIN

SEE YOUR INTERNATIONAL INDUSTRIAL TRACTOR DISTRIBUTOR

The rope won't suffer long. First the stretch, then the "bang" as it breaks. Tough on the rope—but it gives us vital information!

Check and test . . . check and test

In the making of Bethlehem wire rope, quality control is a fundamental point. It is a factor as basic as proper design; it is the core, the heart, of our careful manufacturing methods.

Throughout this program of quality control, many different tests are employed, for no single test will suffice. The one shown here is an excellent example —one that is cruel to the rope but that yields vital facts.

Offhand, you wouldn't think that any machine could possibly break that big, stout Bethlehem rope. It is made of tremendously strong steel wires, and it will lift or support many tons. Yet the machine pictured can break the rope in a matter of seconds. Object: to establish the ultimate tensile strength of the rope.

This rigorous treatment is all part of our overall formula. From open hearth to finished rope, it's check and test, check and test. Nothing is left to chance. Because of this attention to detail, you can depend upon Bethlehem rope to do the job expected.

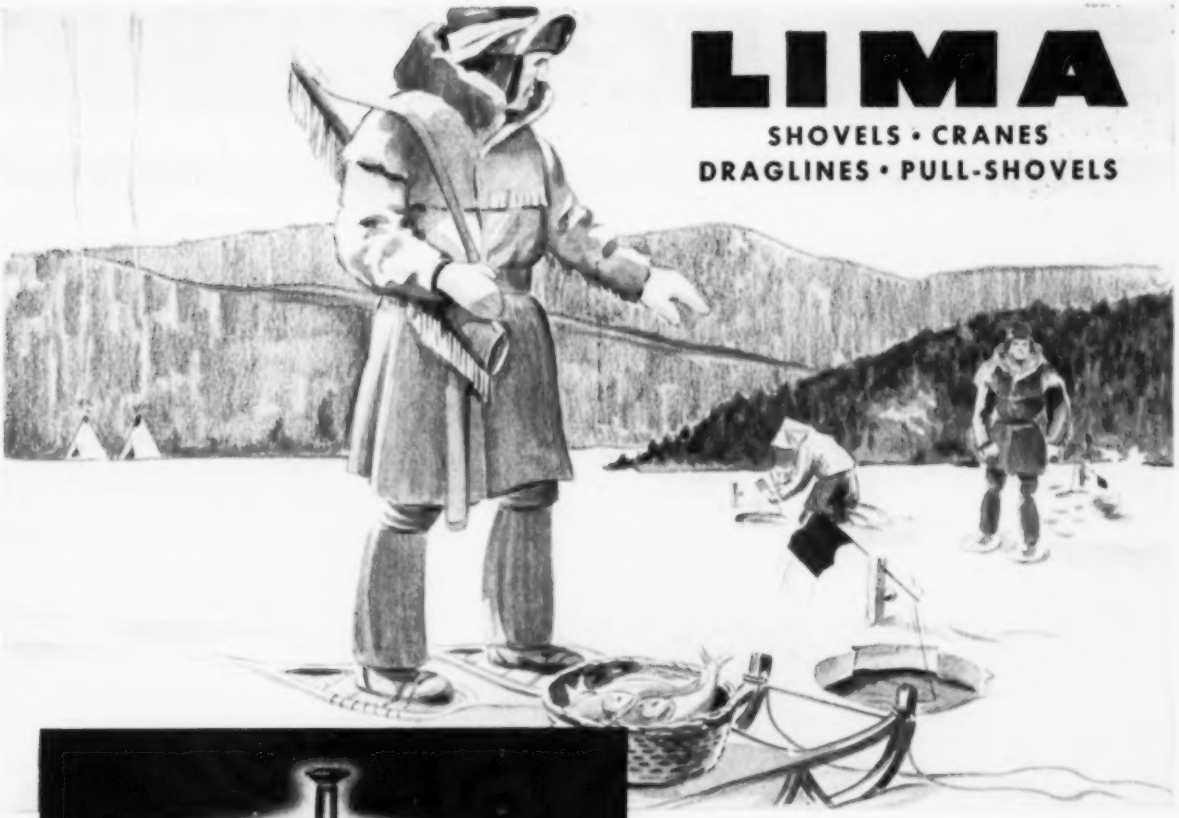
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

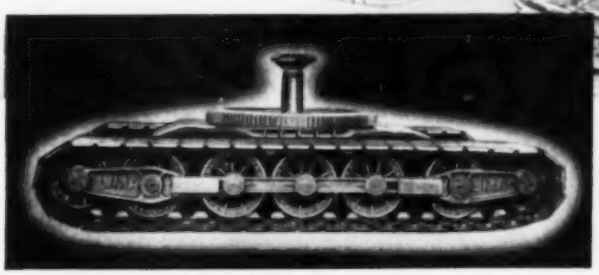
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

When you think WIRE ROPE . . . think BETHLEHEM

LIMA

SHOVELS • CRANES
DRAGLINES • PULL-SHOVELS





The Right Footing to Get There when the Going's Tough

When the snow is soft and deep, the smart sportsman doesn't bog down trying to buck it. He straps on his snow shoes—and the increased bearing area lets him go up and over the drifts.

It makes equally good sense to buy a shovel, crane or dragline that's built to ride over *not through* the soft spots—a LIMA, of course.

The crawlers on a LIMA are long and wide to give ample stability. Slightly elevated at the front to give a sled runner effect—self-cleaning—the LIMA crawler takes the tough spots right in stride.

So, when you're looking for equipment with greater working range—that will operate in the bad spots as well as the good ones—call your nearest LIMA Sales Office or Distributor. You'll find there are many other features—air actuated clutches, wide drums, anti-friction bearings throughout, etc.—that will help you set new performance records.

LIMA SHOVELS are available in capacities from ¾ to 6 yards.

LIMA CRANES are available in sizes to 110 tons capacity.

LIMA DRAGLINES are available in variable capacities to suit specific needs.

Wheel or truck mounting is available on machines of ¾ and 1½ yards capacity.

BALDWIN-LIMA-HAMILTON CORPORATION
Construction Equipment Division
LIMA, OHIO, U.S.A.

BLH — Baldwin-Lima-Hamilton — Construction Equipment Division

9% MORE OUTPUT

By saving 15 to 25 seconds every time it dumps, Koehring heavy-duty Dumptor earns an important increase in yards hauled per hour. For example: At 16 trips an hour on a typical 1000-foot one way haul, saving an average of 20 seconds every cycle gives you 5.3 minutes more productive haul-time . . . and adds 9% to hourly yardage output.

There is no waiting for slow-acting body hoists. With Koehring gravity dump it takes just one second to dump a full 6-yard load. Operator trips the body release lever, and gravity instantly tilts the scoop-shaped body 70° . . . one second later the body is empty, and Dumptor is on its way back for another load.

You get this same one-second dumping even in sub-zero weather because gravity dump never balks . . . never wears out. And you don't lose time or spend money on expensive hoist maintenance or costly replacement parts because Koehring Dumptors have no body hoists.

One-second gravity dump and no body hoist maintenance are typical of Koehring Dumptor's basic principle . . . to reduce all non-productive time and costs to the absolute minimum . . . and to increase work-time for more yards per hour, more profit per yard for you.

Dumptor has many other cost-cutting advantages worth checking . . . it will pay you to get all the details from your Koehring distributor, or write to us for 28-page Dumptor catalog.

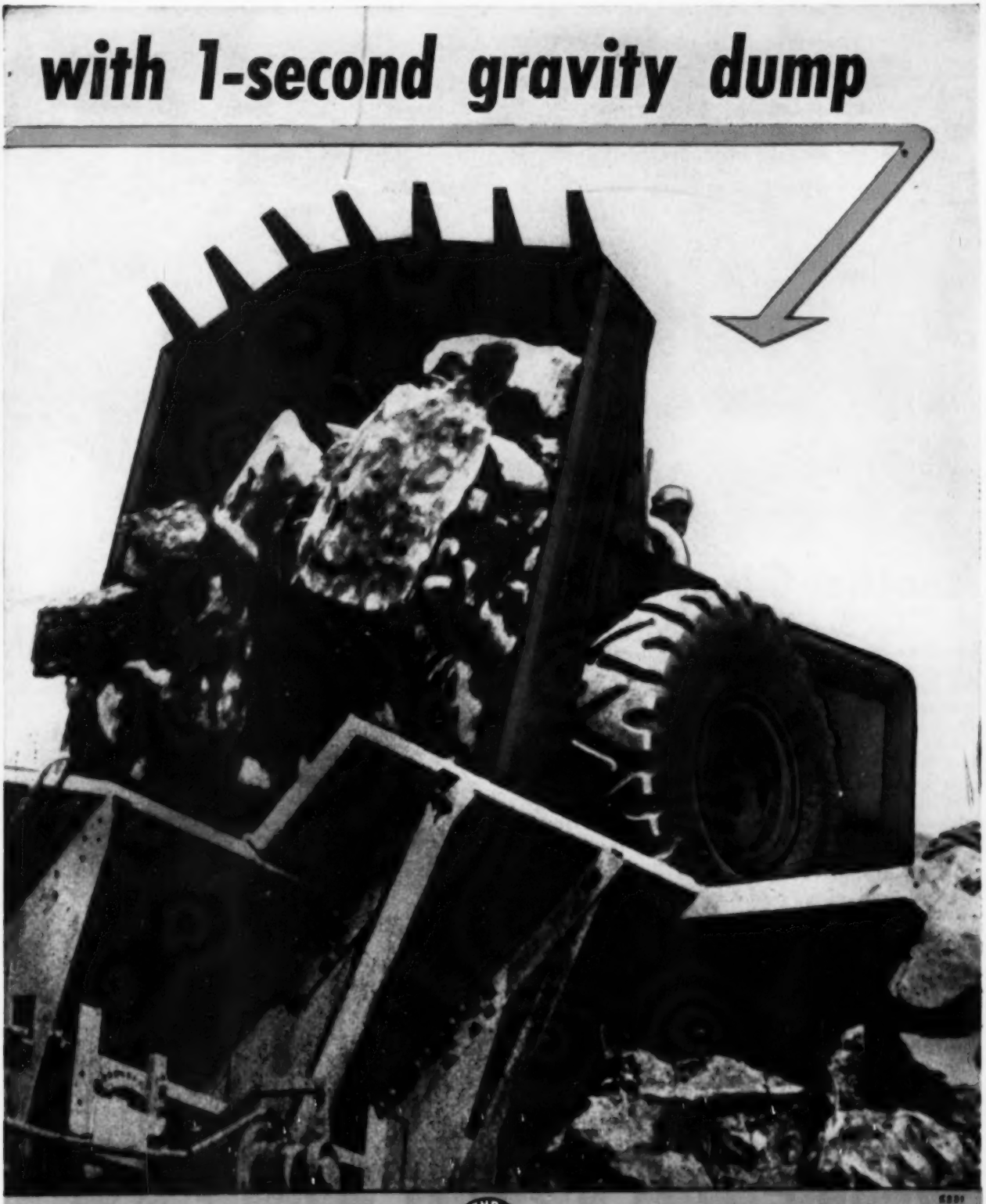
KOEHRING COMPANY • Milwaukee 16, Wis.

Subsidiaries: KWIK-MIX • PARSONS • JOHNSON

FAST CLEANING scoop-shaped body has all-welded sides, ends and bottom heavily reinforced with 4" channel ribs for toughest rock service. Triple strength is built into steel-oak-steel bottom . . . free-swinging kick-out pan adds another steel layer.

NO-TURN SHUTTLE HAUL is another production-boosting Dumptor advantage. Heavy-duty constant-mesh transmission gives the same 3 fast speeds forward and reverse . . . saves turning at the loading unit, on the haul, at the dump . . . speeds cycles.

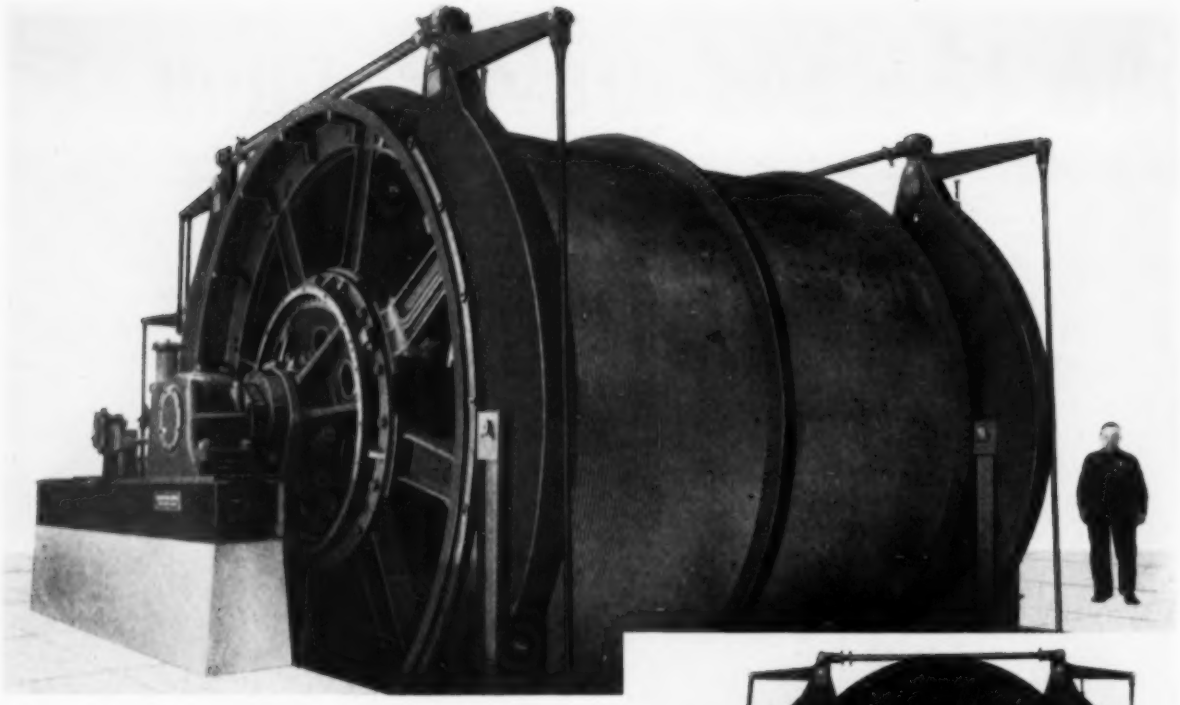
with 1-second gravity dump



KOEHRING DUMPTOR®

EXCAVATORS . . . ½ TO 2½ YARDS

CRANES . . . 7¾ TO 79½ TONS LIFT CAPACITIES



Another Giant Hoist

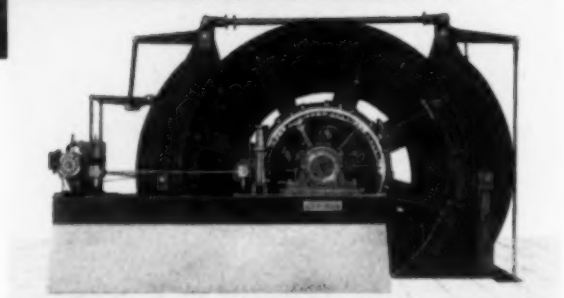
for Service Overseas

This huge electric mine hoist embodies every approved advantage for fast, safe, hoisting in a shaft 800 meters deep. Designed primarily for balanced hoisting of men and materials from several different levels, it will be used also, at times, for hoisting ore. Vulcan double-deck cages and "Allcasteel" sheaves were furnished for the same installation.

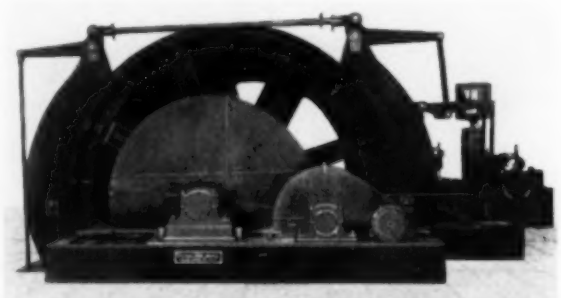
Each of the two all-steel built-up cylindrical drums is 18′-0″ in diam. by 8′-1″ in width with accurately-machined helical grooves for stowing approximately 2800 feet of 1½″ rope in one layer. The "loose" drum is equipped with a positive toothed-type clutch. Parallel-motion post-type brakes on each drum are equipped with pressure-graduating rigs and controlled by dependable safety devices which apply the brakes automatically in event of power-failure, overspeed or overtravel. Brakes and clutch are both operated by oil-hydraulic engines and, on the loose drum, are mechanically and electrically interlocked.

Other superior features, here illustrated and described, combine to assure the dependable trouble-free service that has made Vulcan hoists the standard of the mining world for more than a hundred years.

Correspondence is invited regarding any requirement for heavy-duty hoists, sheaves, cages, skips, etc. Illustrated bulletins mailed promptly on request.



Shop assembly, showing positive toothed-type clutch, oil-hydraulic clutch engine and, at extreme left, oil-hydraulic brake engine controlled by Lilly safety device. Heavy weights for applying the brakes will be located in pits below the floor level.



Shop assembly, showing oil-tight welded-steel casings for double-reduction herringbone gears, through which the hoist will be driven by a 500 hp. wound-rotor induction motor. Main shaft and both pinion shafts are mounted on self-aligning spherical roller bearings. Other modern features include a Trip Recorder, a Recording Tachometer and a Centralized-Control Desk on the floor level.

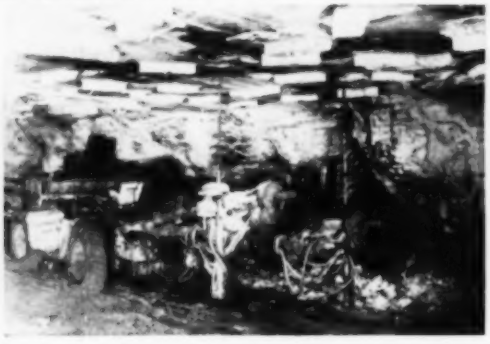
Vulcan Iron Works

Established 1849

WILKES-BARRE, PA., U.S.A.

New York City Office, 50 Church Street

DESIGNERS AND BUILDERS OF ELECTRIC HOISTS, "ALLCASTSTEEL" SHEAVES, CAGES, SKIPS, GUNBOATS, ETC., UNDERGROUND CONVEYORS AND ALL TYPES OF LOCOMOTIVES FOR BOTH UNDERGROUND AND SURFACE HAULAGE



What's your problem?

H. Dillingham of Standard Oil's Evansville, Indiana, office, helped this midwest mine use SUPERLA Mine Lubricants to good advantage. He was close at hand, gave operators engineering service when they needed it.

There's a corps of Standard Oil lubrication specialists throughout the Midwest. You'll find one located near your mine. Through special training and a lot of practical experience, this man has gained a working knowledge of lubrication that can mean real savings for you. To obtain his services, simply contact the nearest Standard Oil office. Discuss with him the savings you can make with such outstanding products as:

STANOIL Industrial Oils . . . Here's *one* line of oils that provides cleaner operation of loader and crane hydraulic units; supplies effective lubrication in compressors, gear cases, and circulating systems. One or two grades can replace a wide variety of special oils and lubricants.

CALUMET Viscous Lubricants . . . On open gears and wire ropes, these greases strongly resist washing and throw-off. Their superior wetting ability affords better coating of gears and better internal lubrication of wire rope.

Here's versatile lubrication, plus!

• At a midwest mine, two grades of SUPERLA Mine Lubricants not only have handled successfully a wide variety of jobs but have proved superior in each application to special products previously used.

SUPERLA Mine Lubricant No. 00 has served for over three years in the gear cases and hydraulics of the mine's loaders. Despite hard operation of these machines, there have been no clutch failures, and clutch plates have remained free from carbon deposits. There have been no bearing failures. Hydraulic units have operated efficiently with no downtime for maintenance.

SUPERLA Mine Lubricant No. 4 has been used for over three years in loader gathering heads. On this punishing job, it has prevented any trouble caused by lubricant deterioration or breakdown. Bearing wear has been kept to a minimum.

Shuttle car lubrication and service in a roof bolting drill are among the uses of SUPERLA Mine Lubricants in this mine. The versatility of these products has simplified lubrication and the stocking of

SUPERLA
®G. U. S. PAT. OFF.
Mine Lubricants

lubricants. It has eliminated the costly use of special-purpose oils and greases.

You'll find among the six grades of SUPERLA Mine Lubricants the right combination for successful lubrication of your loaders, cutting machines, shuttle cars, and related equipment. The Standard Oil lubrication specialist in your section of the Midwest will help you get the best possible results. You can contact him through your local Standard Oil Company (Indiana) office. Or write: Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Illinois.

STANDARD OIL COMPANY **STANDARD** *(Indiana)*

RECOVER COAL FINES

WITH EIMCO AGIDISC

Eimco Agidisc filters are heavy-duty, dependable machines built for continuous 24 hour operation in dewatering fine coal.

These filters will:

1. Reduce moisture contents in the fine coal to 15% or better, depending on the other plant equipment.

2. Produce a clear filtrate which contains less than the allowable ppm solids permitted under existing anti-pollution laws.

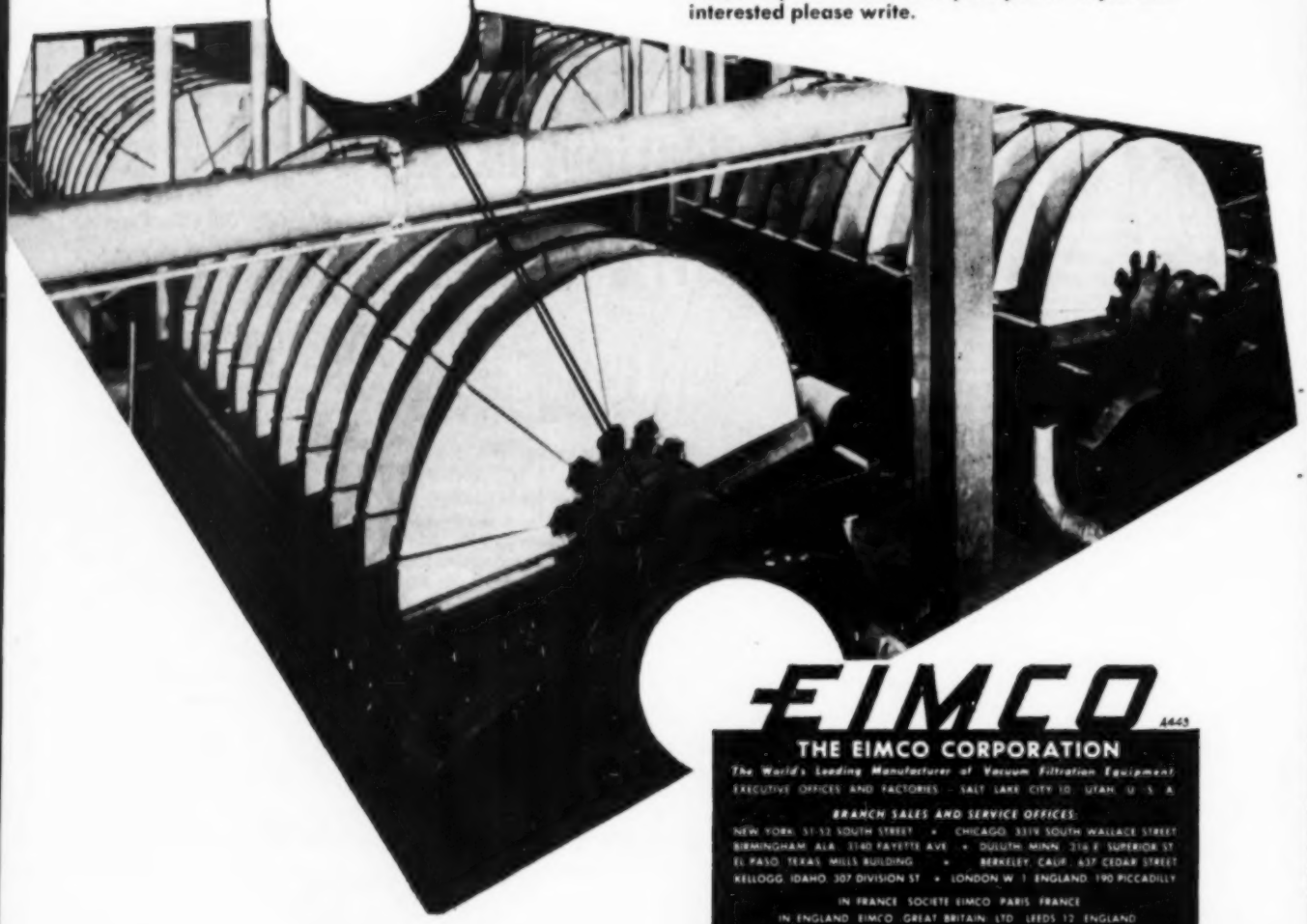
3. Permits uniform cake distribution over the entire surface of the disc with a resultant even drying of the fine coal filter cake.

4. Produces greater tonnage of dewatered coal per square foot of filter surface.

5. Save a product that has been considered too expensive to process — providing additional profits per ton of coal washed.

6. Pay for itself in a very few months.

Eimco Agidisc filters are doing an outstanding job in many coal washing plants and coal pond reclamation projects. Arrangements can be made to put a test unit in your plant. If you are interested please write.



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in WIRE ROPE, too, survival calls for the RIGHT KIND of muscle

Powerful, constrictive muscles give the python the crushing strength that enables him to exist under the grim rules of jungle law—where only the fittest survive.

Same way with wire rope. Here again, ability to last under adverse conditions demands the right kind of muscle. Bending Fatigue . . . Shock Stress . . . Abrasion . . . Load Strain—each demands wire rope that best combines the required resistance factors to overcome the destructive forces encountered in different types of service.

Complete quality control from ore to finished rope; long experience and specialized know-how — these are your assurance that in Wickwire Rope you always get the right construction . . . the right grade of steel and size of wire for long-lasting reliable service on your particular job.

See your Wickwire Rope distributor or contact our nearest sales office.

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A YELLOW TRIANGLE ON THE REEL IDENTIFIES WICKWIRE ROPE

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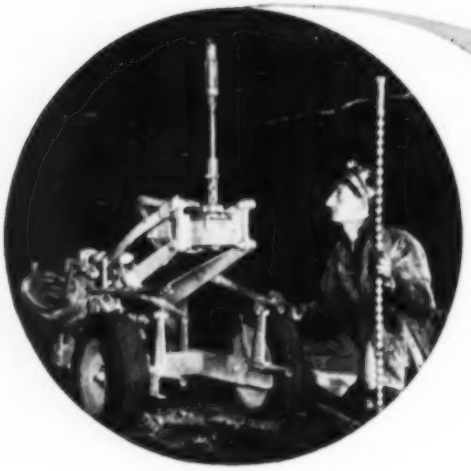

only — *minutes later...*

A COMPLETED BOLTING CYCLE

Now you can accomplish an entire bolting cycle—drill hole and set expansion bolt without repositioning—in 3 minutes flat with a CP PERMISSIBLE RBD-30 Mobile Roof Bolting Unit! One motor drives both auger and bolt-setter. A time-saving telescopic chuck permits 10 inch auger adjustment to conform to roof irregularities.

Built-in slip clutches protect the drill and bolt-setting motor—prevent feed motor from stalling. The fast acting unit operates just as easily in high coal as in low seams.

Write for Bulletin SP-3037.

Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, N. Y.

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RBD-30
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U.S. Bureau of Mines
Approval Plates:
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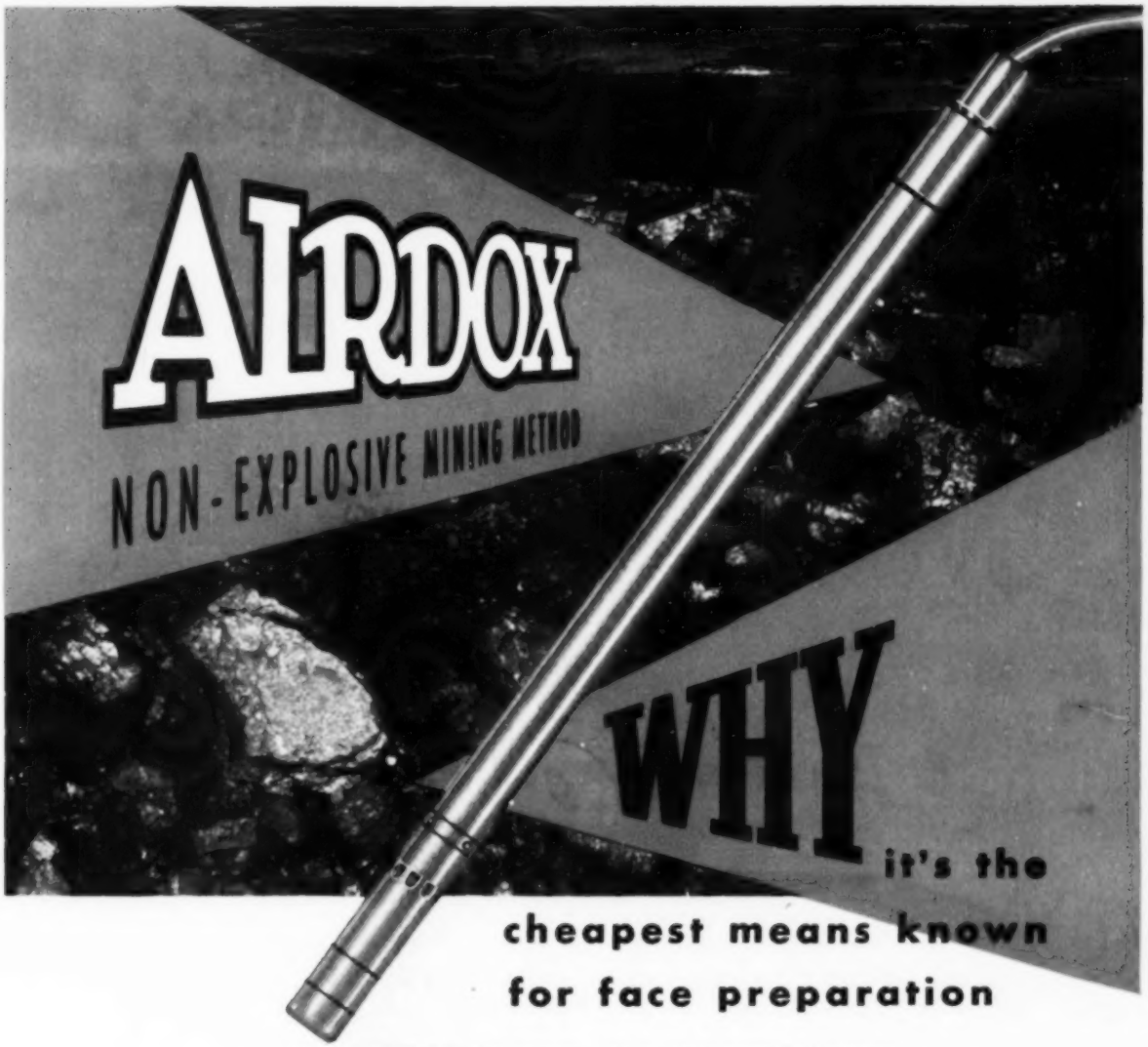
PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES



● AIRDOX, the non-explosive mining method using compressed air, has proven conclusively that it can produce coal at lower cost per ton than any other mining method. There are three major reasons why:

- **Almost without exception, the actual cost per ton of dislodging is less with AIRDOX.**
- **The manner in which AIRDOX dislodges the coal materially increases its loadability.**
- **Cleaning costs are reduced because of the comparative lower percentage of fines.**

Add the further benefits of greater safety and protection of roof structure and you can see why mines are increasingly turning to AIRDOX as a means to increase the profit spread of their operations.

Why not see what AIRDOX can do for you? Write and we'll arrange a free survey.

CARDOX CORPORATION ● BELL BUILDING · CHICAGO 1, ILLINOIS

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Phone: Library, Colonial 3-6910

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Phone: Camden-on-Gauley 2181
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Louisville, Colorado
Phone: Louisville 234

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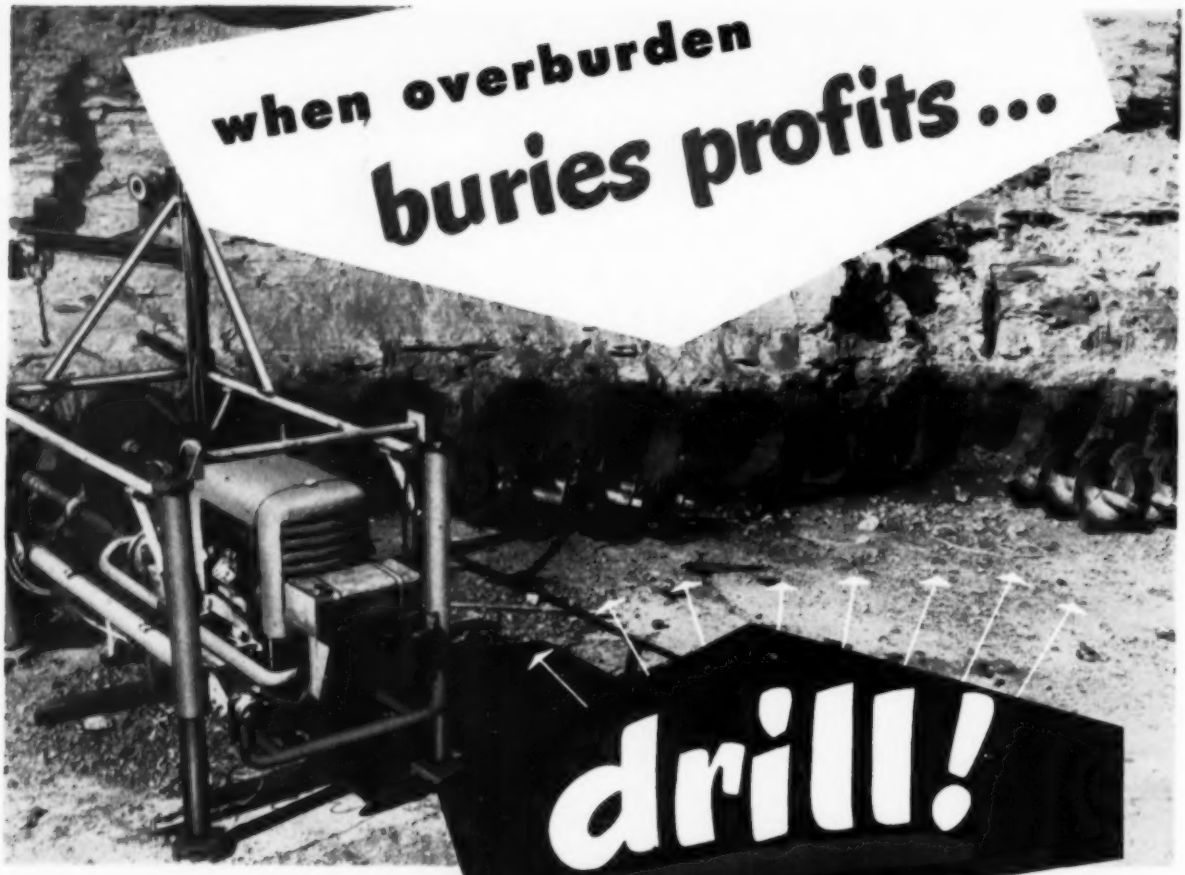

CARDOX Surface AUGER MINER

brings "dead" strip mines back to life . . .

CARDOX Underground AugerMiner

The practical answer for mines where seams or poor roof conditions make conventional mining unprofitable or unsafe. Write for Bulletin.

With a CARDOX Surface AugerMiner you can drill back 10 to 120 feet into coal seams buried by excessive overburden. The cost of salvaging this coal is normally only a fraction of that of the original working by conventional methods. The coal you left behind may be your highest profit tonnage!

CARDOX AugerMiners can be trucked or towed on their detachable wheels to any exposed face of coal. They are self-positioning to the height of the seam. Driven by a rugged 145 H.P. engine, augers up to 36 inches in diameter drill out clean, pure coal, ready for mechanical loading into trucks. Six-foot auger-sections are easily added or removed by the built-in retriever. Directional control keeps the auger boring into the best part of the seam, away from rock and shale.

Ask your CARDOX Representative for the Auger-Miner profit story. Or write for our AugerMiner bulletin.

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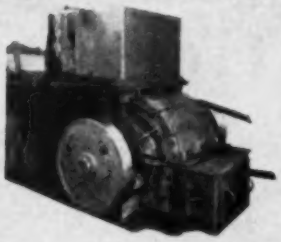
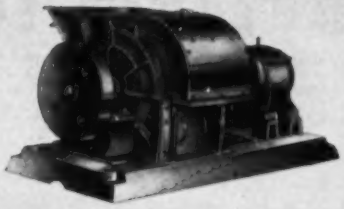
FOR HIGH TONNAGE CRUSHING . . .

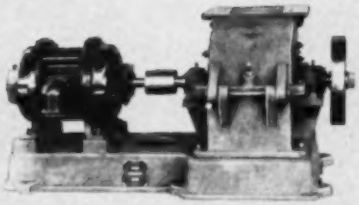


Heavy Duty 30-S. For Primary Crushing. Crushes ROM coal, rock, slate, sulphur balls and gob—high tonnage without oversize. Saves labor costs of pickers.

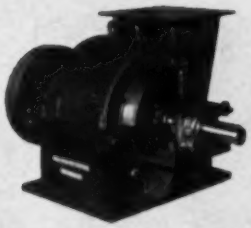


"S" Series. 9 sizes. Capacities up to 500 TPH. High tonnage with minimum fines. Well suited to power plants.

OR COAL SAMPLING . . .

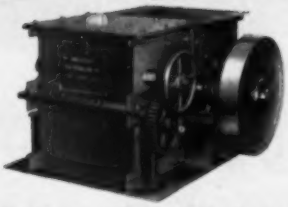


Laboratory Mill. 2 sizes. Capacities up to 2000 lbs./hr. Very efficient for coal sampling.

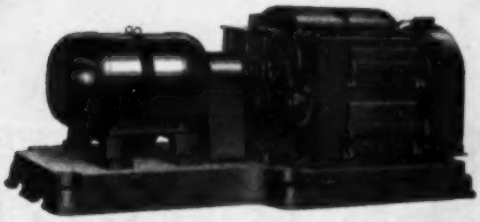


"13" Series. Three sizes. Capacity up to 6 TPH. For experimental runs, testing, and pilot plant operations.

THERE'S AN *American* ROLLING RING CRUSHER . . . FOR YOUR OPERATION!



"WC" Series. 4 sizes. Capacities up to 90 TPH. Available with drop cage. Compact, requires minimum headroom.



"AC" Series. 17 sizes. Capacities up to 800 TPH. Dual adjustability for easy size control. Drop cage for easy cleanout.

WRITE for details today. Describe your crushing needs.

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1119 Macklind Ave.
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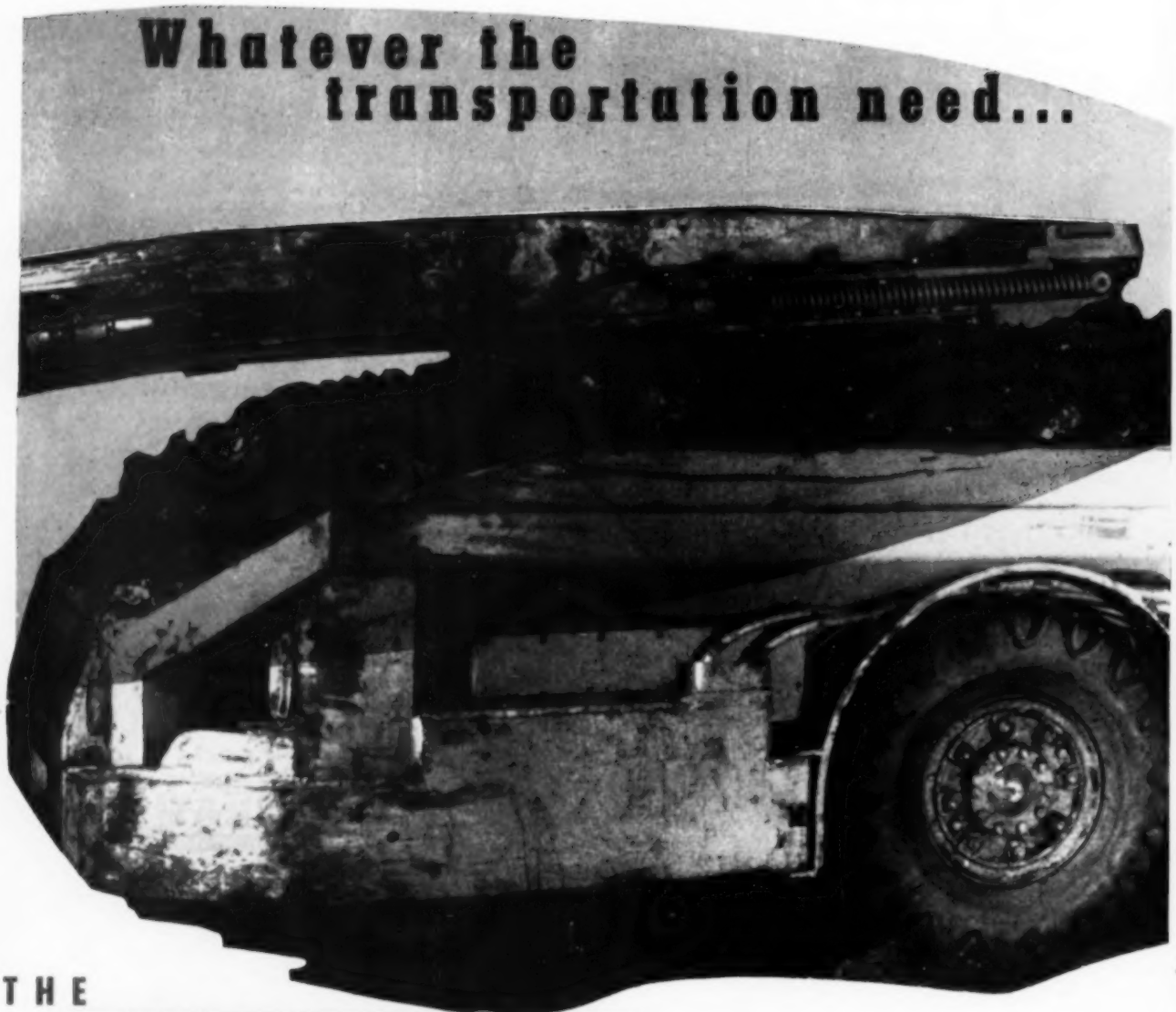
Whatever the transportation need...



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JEFFREY MANUFACTURING

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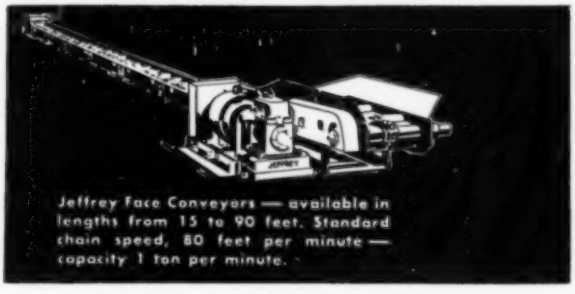
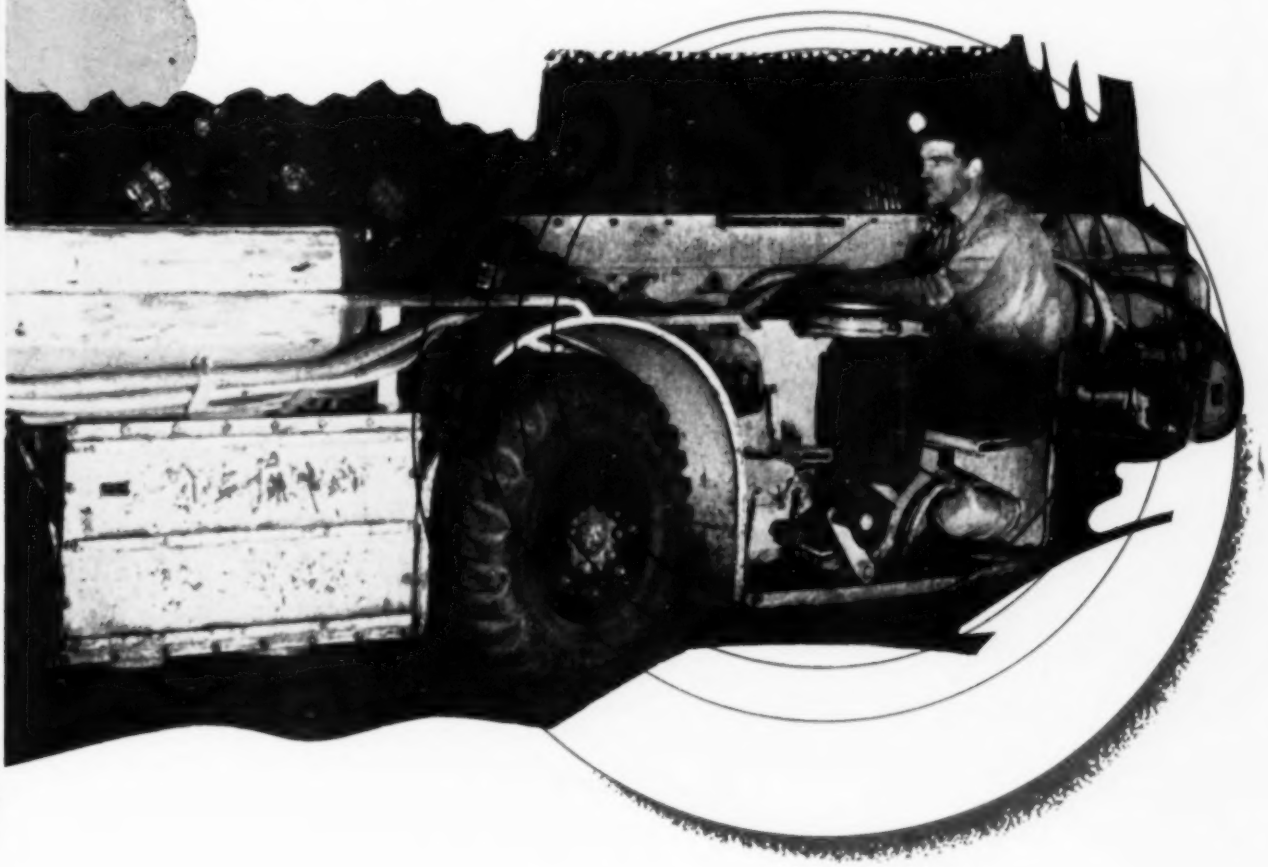


Jeffrey Face Conveyors — available in lengths from 15 to 90 feet. Standard chain speed, 80 feet per minute — capacity 1 ton per minute.

You'll find Jeffrey eager to recommend and supply the right equipment, engineered exactly to fit the job it is to do. Two important methods in the transportation picture are Jeffrey Shuttle Cars and Jeffrey Conveyors with various types and sizes available.

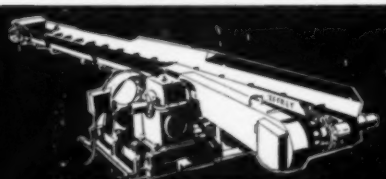
JEFFREY SHUTTLE CARS Large view shows a 42" high Shuttle Car being loaded at the face. Jeffrey Shuttle Cars have proved most economical in transporting coal from the face to the panel entry. Catalog No. 840 gives complete data on models and capacities. Write for it.

JEFFREY CONVEYORS To meet requirements in face, room and entry work, Jeffrey builds a line of conveyors (Chain and Belt types) in which low initial investment has been combined with maximum efficiency in the transportation of coal underground. These conveyors are described and pictured in Catalog No. 820 which will be sent along upon request.



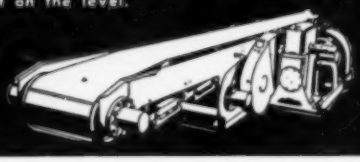
COMPANY · *Established 1877*

COLUMBUS 16, OHIO

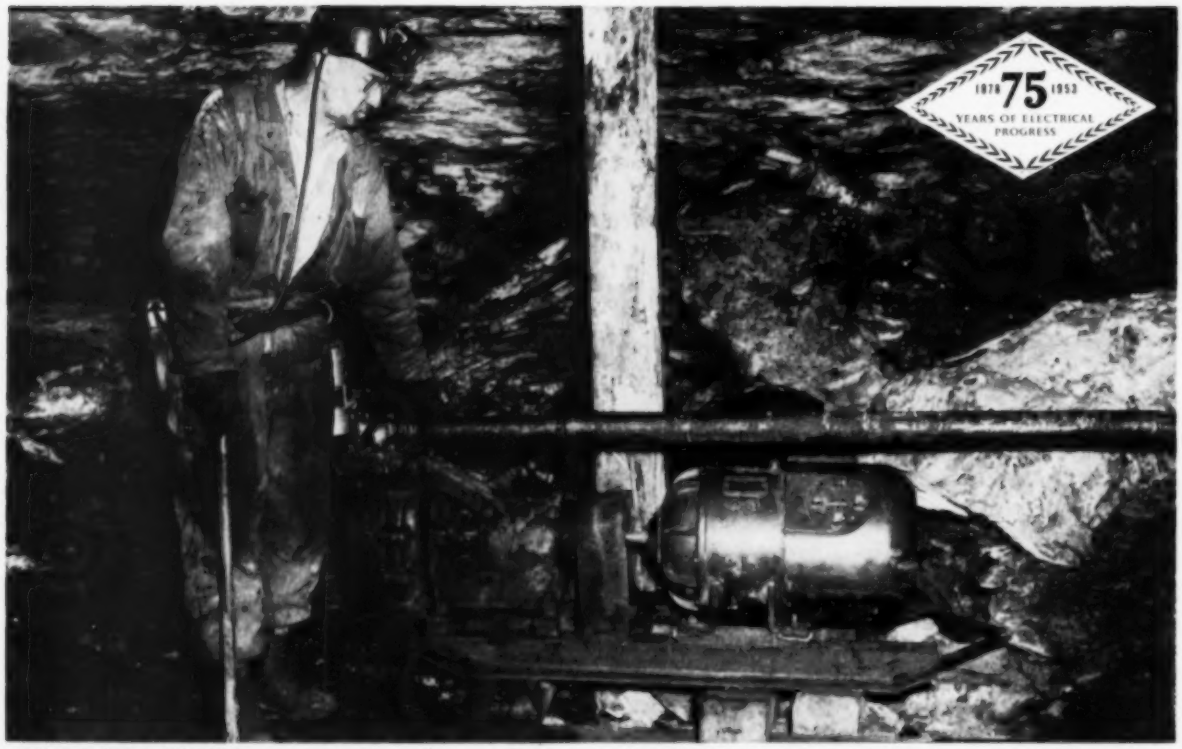


Jeffrey Room Conveyors — maximum length 300 feet. Chain speed varys from 90 to 126 feet per minute — capacities from 1 to 2.5 tons per minute.

Jeffrey Sectional Belt Conveyors — used on panel entries and for main haulage, receiving coal from shuttle cars, room conveyors or from entry conveyors. Have been operated in lengths exceeding 3,000 feet on the level.



Jeffrey Shuttle Cars — built in heights ranging from 30" to 48". All can be furnished with either 2-wheel drive with 2-wheel steering, or 4-wheel drive with 4-wheel steering. Capacities 3½ to 6½ tons.



NEW G-E MINE MOTORS are now serving a large coal producing company in the Pocahontas coal fields. Ten are used to drive gathering pumps close to the working face, as shown here, where they pick up mine water and deposit it in a large sump. G-E mine motors resist corrosive mine water and coal dust, last longer in mining service.

New motor easily maintained in mine

TWO-STUD BRUSH CONSTRUCTION permits locating all brushes on one half of commutator—makes them easy to reach through two large hand holes instead of four.

G-E mine motor permits checking brushes, changing cable, without dismantling motor

You'll find all the features wanted most by mining men in General Electric's new totally enclosed d-c mine motor:

Easier to maintain No need to take motor apart or off your machine. Two-stud construction makes all brushes easier to reach. Removable cable gland permits easy cable replacement if necessary.

Longer-lasting Corrosive mine water and coal dust won't harm it, thanks to cast-iron end shields and heavy rolled-steel magnet frame.

Easier to install Fits in minimum mining-machine space because no part extends beyond this compact motor's normal width.

Whether you buy or build mining machines, learn more about this new G-E motor. Ask your G-E Apparatus Sales representative, or write for Bulletin GEA-5553 to General Electric Co., Sect. 663-34, Schenectady, N. Y.

You can put your confidence in—

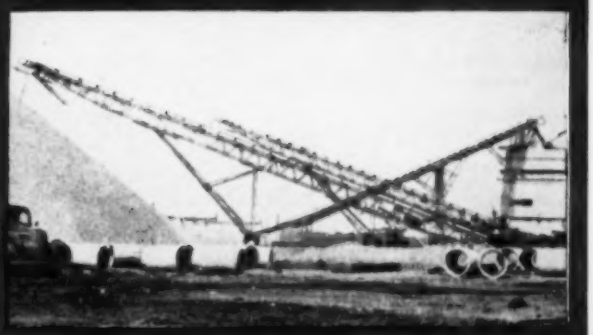
GENERAL ELECTRIC

WHAT TYPE "STACKER" DO YOU NEED IN YOUR BUSINESS?

BARBER-GREENE SUPPLIES THEM ALL

RADIAL STACKERS

Radial stackers have a pivoted receiving end about which the conveyor revolves to load direct to truck, to load in a kidney-shaped pile or to classify into different piles. May be mounted on swivel wheels or on swivel trucks operating on curved rails. Rotation is by hand or power. Furnished in all belt widths to lengths as great as 150 feet on curved rail tracks.



TRAVELING STACKERS

By the same system, traveling stackers may be moved from one position to another to make stock piles in various sizes and locations. May be mounted on wheels, crawlers or trucks. One popular type is mounted on four wheel trucks to move horizontally to build stock piles in long, straight lines. Traveling Stackers are furnished in all belt widths to lengths of 150 feet.

FIXED STACKERS

The most widely used stacker system. Fixed stackers are designed for applications where the material is to be elevated and discharged from a cantilever position at the head end onto a surge pile or a disposal pile. Here, as with radial and traveling stackers, the absence of support structures in the surge or stock piles does not interfere with the operation of reclaiming machines. All belt widths and lengths.

Barber-Greene

BG

Aurora, Illinois, U. S. A.

INSIDE AN EXIDE-IRONCLAD

Inside . . . where it counts most . . . EXIDE-IRONCLAD is entirely different than any other battery. It's made that way by EXIDE'S exclusive IRONCLAD slotted-tube construction . . . a principle that provides direct operating-hour savings for you.

OF ALL BATTERIES, ONLY EXIDE-IRONCLADS HAVE POWER TUBE POSITIVES

The positive plate is different . . . unique . . . exclusive. It is the most effective retainer of active material yet demonstrated in heavy duty service. Slotted tubes contain the active material. So fine are the slots that, while permitting easy access of electrolyte, they retard the active material from washing out, hold it during repeated cycles of charge-discharge, and the vibration of rough use.

Today's battery-powered equipment is being used harder than ever before. Unless the batteries have internal shock protection they tend to deteriorate under hard usage—both electrical and mechanical. Only Exide-Ironclad has the plus-protection of the tubular positive that can withstand today's more exacting and rigorous heavy-duty battery services.

Your EXIDE sales engineer will give you the factual inside story. See for yourself why *only* an EXIDE-IRONCLAD gives maximum day-after-day service under the most difficult operating conditions . . . *with a minimum of maintenance expense.*

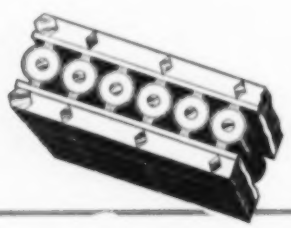
THE ELECTRIC STORAGE BATTERY CO.
Philadelphia 2
Exide Batteries of Canada, Limited, Toronto

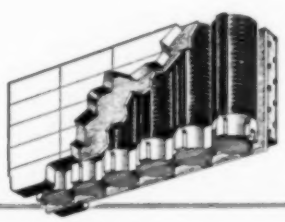
1888 . . . DEPENDABLE BATTERIES FOR 65 YEARS . . . 1953

Cross section shows relation of positive plate to separators and negative plate. Note the much greater exposure of active material to electrolyte as compared with that of the usual flat positive plate. This greater exposure makes possible the high power ability and uniform-voltage characteristics of the Exide-Ironclad. The negative plates have been made extra heavy to balance the increased capacity of the power tube positives.

Running through center of each tube is an alloy core which is cast with the heavy top cross bar. These form the sturdy, non-buckling grid. Both core and top bar are made of Exide's new corrosion-resistant Silvium, an alloy of silver, lead and other components, which adds greatly to plate's long life.

New polyethylene insulating tube sealer of acid-proof, non-corroding plastic fits snugly into bottom of slotted tubes and further reduces loss of active material. Thus more active material remains available, and the high battery capacity is maintained for a longer working life.

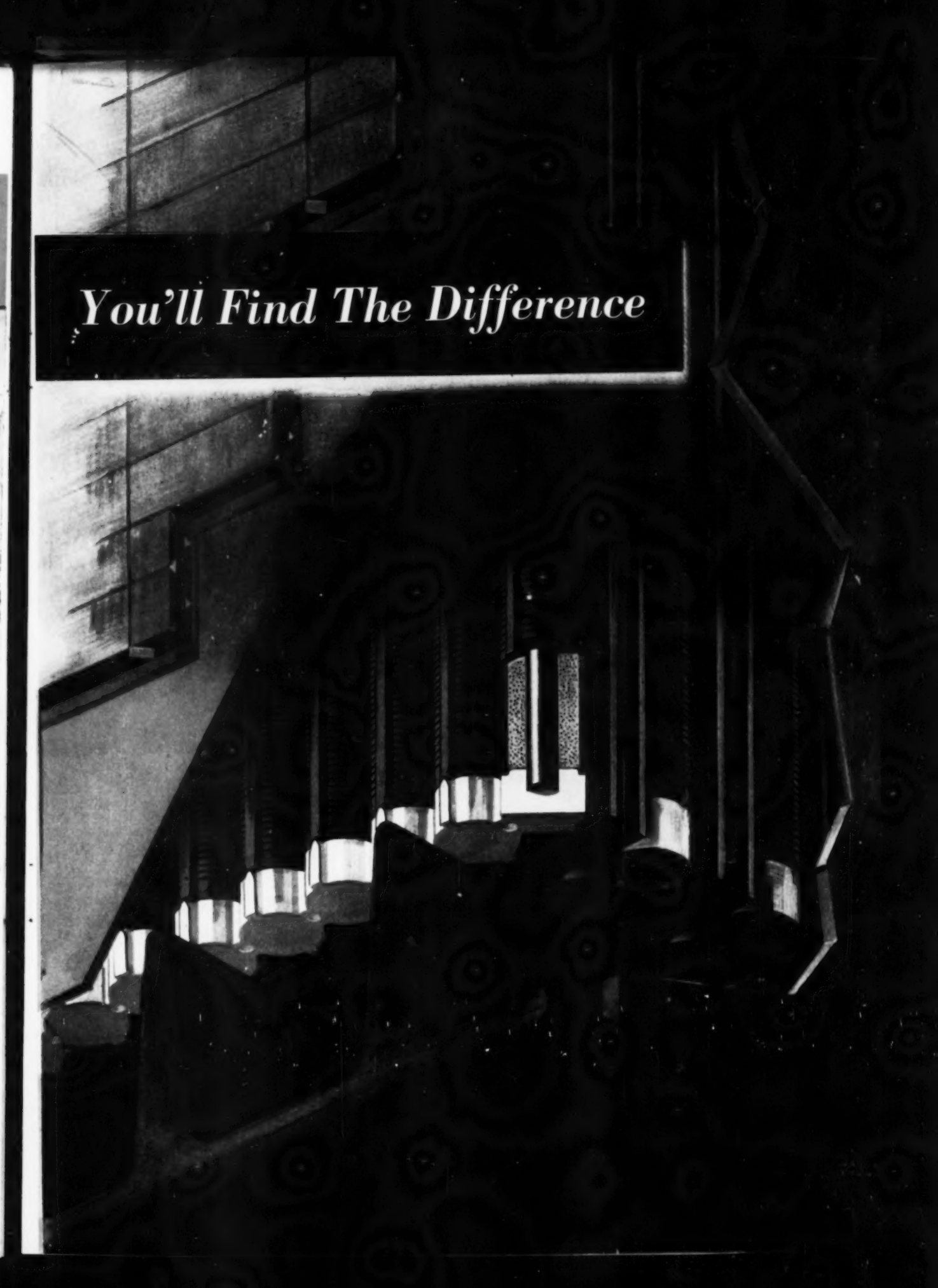




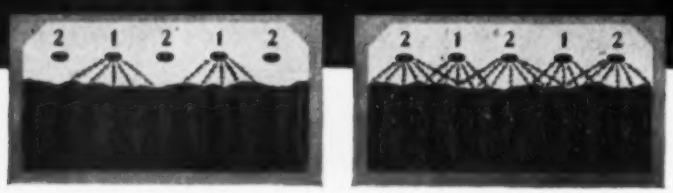
Exide-Ironclad

YOUR BEST POWER BUY . . . AT ANY PRICE

"Exide-Ironclad" and "Silvium" *Reg. T.M. U.S. Pat. Off.*


You'll Find The Difference

Here's how ROCKMASTER® gives better breakage



The first delays put the rock under stress. Then the number two punch of the second delays cuts across the lines of force at points of maximum stress giving maximum breakage.

THIS unusual sequence of photos shows explosives force, first swelling and then bursting a solid face of granite. It is visual evidence of the excellent breakage possible with the ROCKMASTER blasting system used in an alternate pattern.

Theory behind the breaking action of this pattern is that the first delays, detonating within definite limits of controlled timing, place the entire burden under stress. Then at the moment of maximum tension the second delays, also firing with controlled timing, throw the second punch which produces a wedging and bursting action throughout the burden. The explosives gases of alternate ROCKMASTER blasting can be kept under prolonged confinement, reducing both air blast and ground vibration to a minimum.

Alternate action cannot be duplicated by progressive milli-second delay firing methods or by any form of top detonation.

If you want to see how others have profited by using ROCKMASTER milli-second delay detonators with the ROCKMASTER system of explosives choice and loading methods, send for your free copy of the paper "Overburden Blasting Techniques."

ATLAS

ATLAS EXPLOSIVES

"Everything for Blasting"

ATLAS POWDER COMPANY, WILMINGTON 99, DELAWARE

Offices in principal cities

Add Up the Savings with

Gulf Mining Machine Lubricant

1. lower maintenance costs
2. reduced out-of-service time
3. simplified lubrication storage and handling

$ _____ *your total savings*

When you use Gulf Mining Machine Lubricant you can eliminate two or more other lubricants, depending on the type of cutting and loading equipment you operate. At the same time you provide better lubrication for the bearings and gears.

Result: more operating hours for equipment, less down time for repairs and lubricant application. For additional information on Gulf Mining Machine Lubricant, send the coupon below or call in a Gulf Sales Engineer.

GULF INDUSTRIAL LUBRICATION

Gulf Oil Corporation—Gulf Refining Company CA
719 Gulf Building, Pittsburgh 30, Pa.

Please send me, without obligation, a copy of your pamphlet "Gulf Mining Machine Lubricant."

Name .....

Company .....

Title .....

Address .....

PUMP'S FINE TODAY... BUT HOW ABOUT TOMORROW?

With Rex and only Rex

You're assured new pump efficiency for the lifetime of the pump because . . .

ONLY REX HAS THE ADJUSTABLE AIR PEELER!

Every self-priming, centrifugal pump must have an air peeler to remove air from the suction line and create the vacuum that draws water up to the impeller. Normal wear on the peeler and fast-moving impeller destroys the necessary close clearances between these parts . . . reducing both priming and pumping efficiency.

Here's where *Rex alone* can maintain original priming and pumping efficiency for life. A simple adjustment of the *exclusive Patented Adjustable Air Peeler* and you've restored its original close clearance with the impeller. Just a twist of the wrist and you've restored new pump efficiency . . . for today . . . and tomorrow.

Get all the details on this and other exclusive Rex features from your local Rex distributor or write to Chain Belt Company, 4786 W. Greenfield Ave., Milwaukee 1, Wis.

CHAIN BELT REX COMPANY

CONSTRUCTION MACHINERY

Dave O'Leary, Shop Superintendent, and Joe Koehn, Fitting Shop Foreman, look over a blueprint in the Heyl & Patterson Fitting Shop. Both men are 30-year veterans with Heyl & Patterson.

"Old Pros" with the "FOLLOW THROUGH" that counts!

The "Follow-Through" is one of the many ingredients that contributes to the successful performance records of Heyl & Patterson designed, fabricated and erected equipment.

Here is a picture snapped in the Heyl & Patterson Fitting Department. It's a "natural" showing how our shop men "follow-through" from the original designs of our Engineering Department. Compare the picture of these "Old Pros" with the "Follow-Throughs" you have seen on TV in batting scenes from the World Series in baseball and the important winning forward passes in pro-football games. The Heyl & Patterson "follow-through" is possible because we have our own Engineering Department, our own Fabricating Department, our own Machine Shop, our own Erection Department.

The H & P Engineering Department calls the signals and the other H & P Departments know how to "Follow-Through." This is why Heyl & Patterson can guarantee long-life, low-cost performance of Heavy Bulk Materials Handling Equipment.

Heyl & Patterson, Inc.

"SINCE 1887"

Heavy Bulk Materials Handling Equipment

All The Way from Design to Erection

55 WATER STREET · PITTSBURGH 22, PA

in shuttle car cable
there are no "lucky" breaks
-they all cost money!

. . . and four or five breaks can equal the cost of the cable in lost production. Since actual records show different makes have widely varying life expectancy, it pays to choose your cable carefully.

for longer "break-free" service insist on

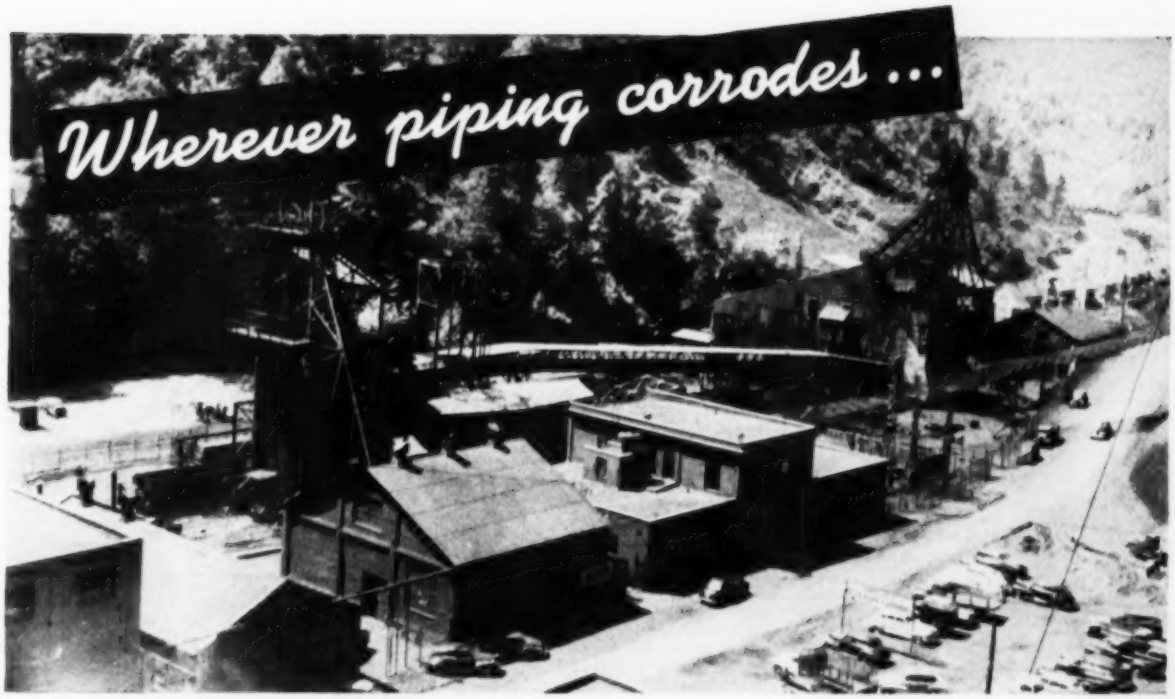
Cold Rubber Insulated **Securityflex**

This ANACONDA portable power cable—the first with cold rubber insulation—won't override, kink or twist. New or aged, it has greater resistance to cutting, crushing, impact, abrasion, heat and moisture penetration than other types. It stands up well under reel tension, passes easily over guides, and won't fatigue readily from frequent sharp bends. Patented "anti-short" breaker strip and flat-stranded grounding wire make it the safest known cable for the job.

When cable repairs skyrocket costs so fast, it's poor economy to buy less than the best. A sample length of Securityflex* Shuttle Car Cable will convince you that this super-safe, super-tough cable can speed your production and cut down those "bad" breaks that leave your men and machinery idle too long. Call your nearest Anaconda Sales Office or Distributor. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

22553 *Trademark

the right cable for the job ANACONDA® **wire and cable**



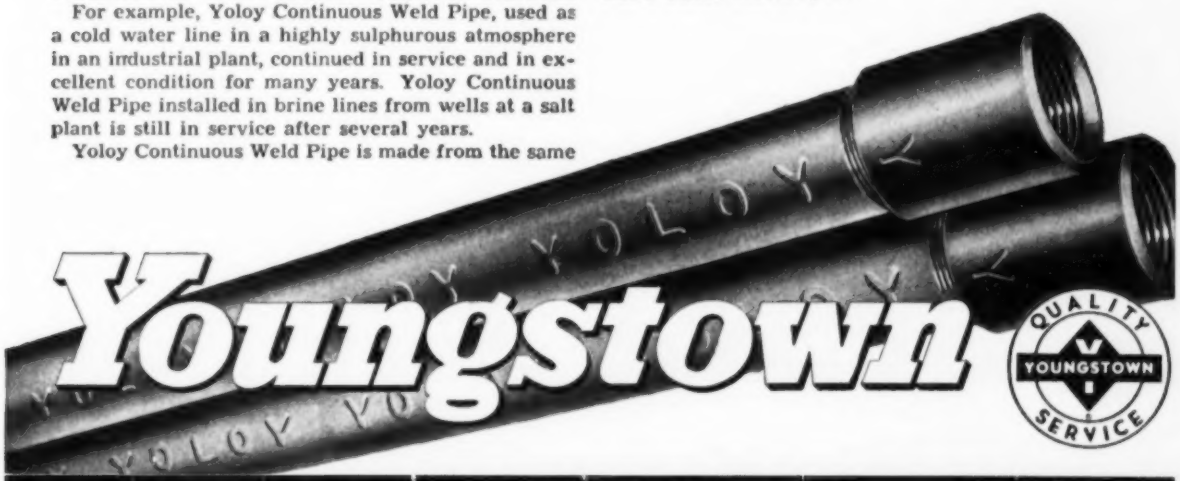
use YOLOY continuous weld pipe

Yoloy Continuous Weld Pipe offers distinct advantages for use in mines and industry where replacements due to corrosion are frequent. In addition, its use is recommended wherever piping is concealed—in commercial buildings, schools and residences.

In standard tests Yoloy steel has demonstrated that its resistance to atmospheric corrosion is four to six times greater than that of regular steels. In actual installations Yoloy Pipe has demonstrated that it has a high resistance to many other corrosive conditions.

For example, Yoloy Continuous Weld Pipe, used as a cold water line in a highly sulphurous atmosphere in an industrial plant, continued in service and in excellent condition for many years. Yoloy Continuous Weld Pipe installed in brine lines from wells at a salt plant is still in service after several years.

Yoloy Continuous Weld Pipe is made from the same nickel-copper steel composition that has proved so successful in service in the oil, mining, railroad, chemical, trucking and other industries where resistance to corrosion and abrasion is of prime importance. This pipe is easy to thread and fabricate with standard pipe tools. It can be electric or gas welded readily. It has high strength and high resistance to abrasion, shock and vibration fatigue. For further information, write or phone the Youngstown District Sales Office nearest you.



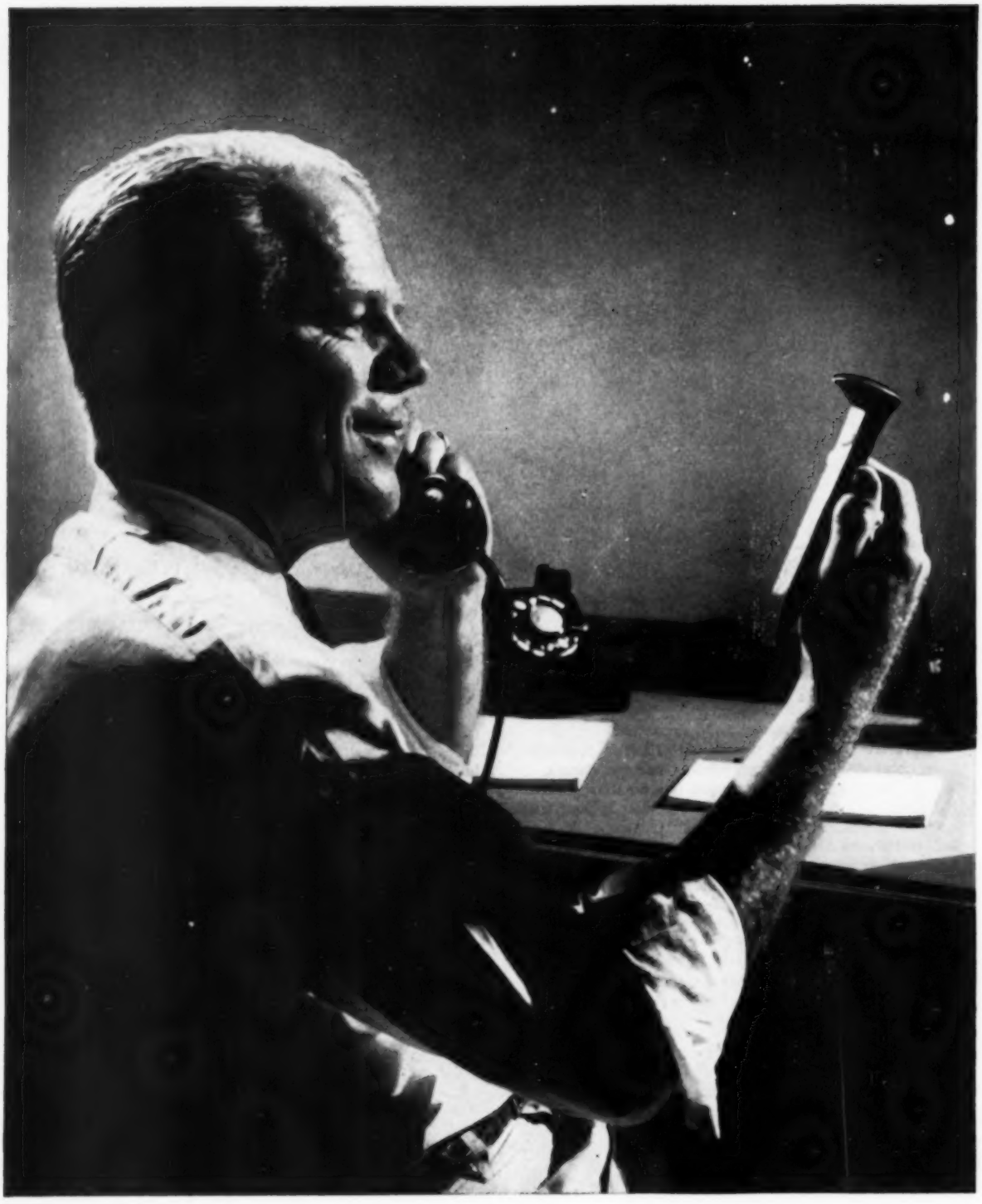
THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices . . . Youngstown 1, Ohio

Export Office-500 Fifth Avenue, New York

COLD FINISHED CARBON AND ALLOY BARS - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - WIRE - PIPE AND TUBULAR PRODUCTS - CONDUIT - RODS - SHEETS - PLATES - BARS - RAILROAD TRACK SPIKES



"That's right, Pete . . . Bethlehem Spikes, same as before.

They've got the good, sharp points that trackmen like."

BETHLEHEM STEEL

Eaton 2-Speed Axle Trucks deliver EXTRA thousands of lower-cost

More than
a Million-and-a Half
in Trucks Today!

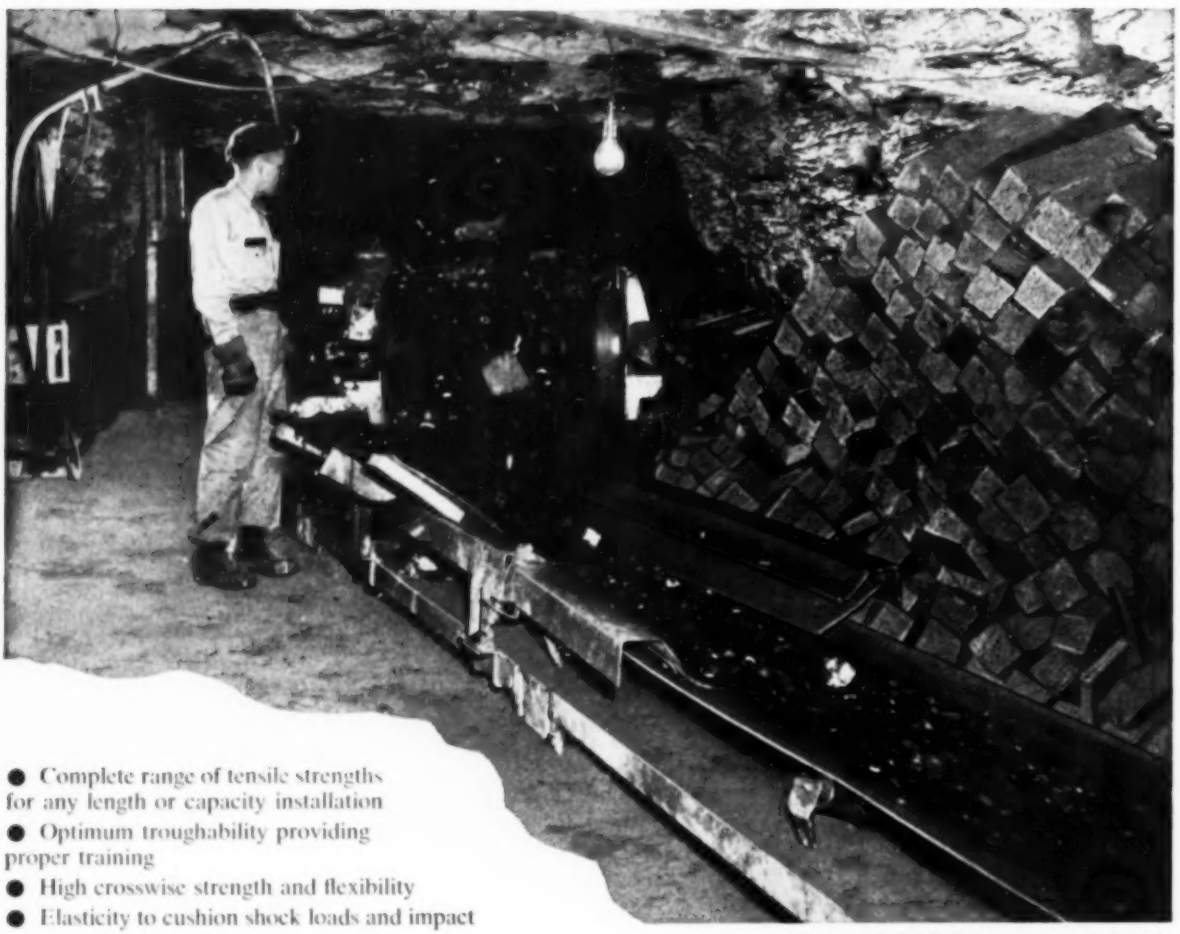
trouble-free miles

Eaton 2-Speeds provide power and speed for quicker full-load trips, at lower cost per mile. Drivers easily select the ratio best suited to road and load, reducing stress and wear, adding thousands of miles to vehicle life. Let your dealer explain how Eaton 2-Speeds make trucks worth more—in use, and when traded-in.

EATON AXLE DIVISION
MANUFACTURING COMPANY
CLEVELAND, OHIO

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

What are the outstanding features of U. S. Rubber's Giant Underground Belts?



- Complete range of tensile strengths for any length or capacity installation
- Optimum troughability providing proper training
- High crosswise strength and flexibility
- Elasticity to cushion shock loads and impact
- Exceptional fastener holding ability
- High quality rubber covers to withstand abrasion, cutting and gouging
- Skim between all plies for increased flex life over small underground pulleys
- Resistance to acid mine waters
- Mildew inhibited carcass

U.S. Giant Underground Belts are obtainable at your nearest U.S. Rubber Mechanical Goods distributor or "U.S." factory branch.

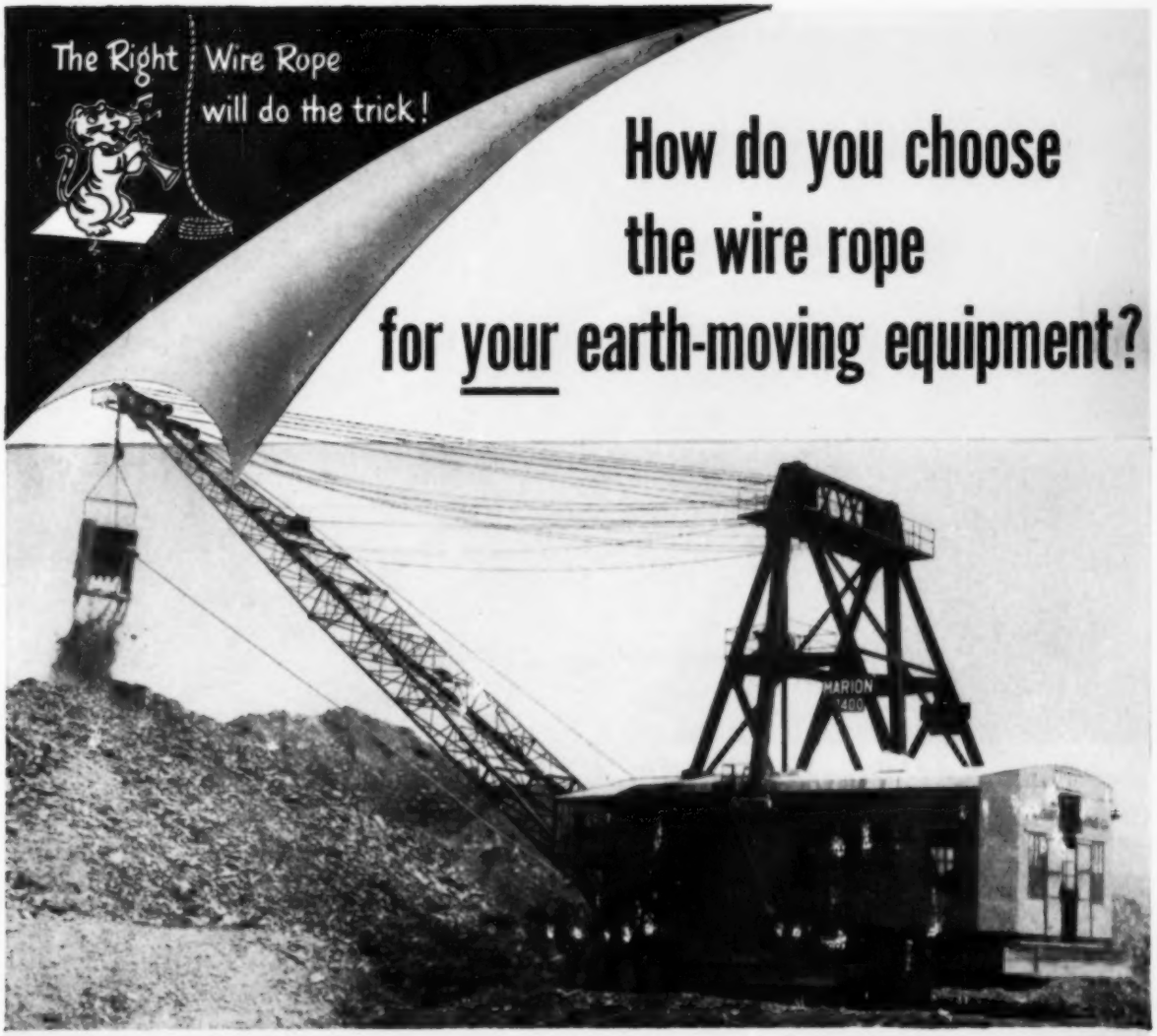
TRANSFER POINT between two 30" 4 ply Style XN U.S. Giant Conveyor Belts. Style XN is a patented construction of cotton and Nylon carcass embodying greater strength and crosswise flexibility at no increase in weight over conventional type belts. More than 15,000 ft. of this belting is operating in this mine.

PRODUCT OF

U.S.RUBBER
SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION · ROCKEFELLER CENTER, NEW YORK 20, N. Y.



How do you choose the wire rope for your earth-moving equipment?

EVERY wire rope on your stripping or excavating machinery needs a particular combination of strength, fatigue resistance, and flexibility. Hoist ropes on big power shovels need high tensile strength to absorb impact stresses and must be extremely tough to withstand constant bending over sheaves. On draglines, drag ropes must possess high strength combined with great abrasion resistance. Boom ropes must have strength plus fatigue resistance.

There's an American Tiger Brand Wire Rope that has been especially designed for every grueling rope job that you will encounter. And it pays to spend a little extra time to analyze your rope requirements carefully and determine exactly which Tiger Brand Rope is the best one to use.

Our experienced Wire Rope Engineers will be glad to help you do this. They know what every Tiger Brand Rope can do and what type of rope every job requires. Their assistance assures you of getting the *right* rope for every job; and that saves you money. Remember, the right rope often lasts up to twice as long as the wrong one. Free engineering service is available through our nearest District Sales Office or by writing to American Steel & Wire, Rockefeller Building, Cleveland 13, Ohio.

AMERICAN STEEL & WIRE DIVISION
UNITED STATES STEEL CORPORATION, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S AMERICAN TIGER BRAND WIRE ROPE

Excellay Preformed

UNITED STATES STEEL

At Panther Coal Company...

Belt reinforced with "Cordura" rayon troughs better... has minimum stretch

Reinforced with Du Pont "Cordura," this belt operates at 275 feet per minute. Driven by a 25-horsepower motor, it carries some 107 tons per hour. During its operation it has never been necessary to stop it for taking-up or other repairs.

According to engineers at Panther Coal Company's Marybill, West Virginia, mine, the 30" slope belt pictured above trains perfectly and has not stretched enough to be noticeable. It was manufactured by Goodyear Tire & Rubber Company on a 4-ply carcass of Du Pont "Cordura" High Tenacity Rayon.

Here's the simple reason why belts reinforced with "Cordura" train better under all operating conditions. Man-made "Cordura" rayon yarn is inherently stronger than yarn of natural fibers. This permits a thinner . . . yet stronger . . . belt, with fewer plies. *Greater strength with less bulk.* These thinner belts are naturally more flexible, sit more snugly on the center idler—and thus have better troughability.

Also "Cordura" has the added advantage of making the belt relatively stretch-free. Find out about belts reinforced with Du Pont "Cordura." We'll be glad to send you the names of suppliers . . . together with full information about "Cordura" rayon. Just write for your FREE copy of the booklet "Sinews for Industry" to: Textile Fibers Dept., Room 4421C, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware. *REG. U. S. PAT. OFF.

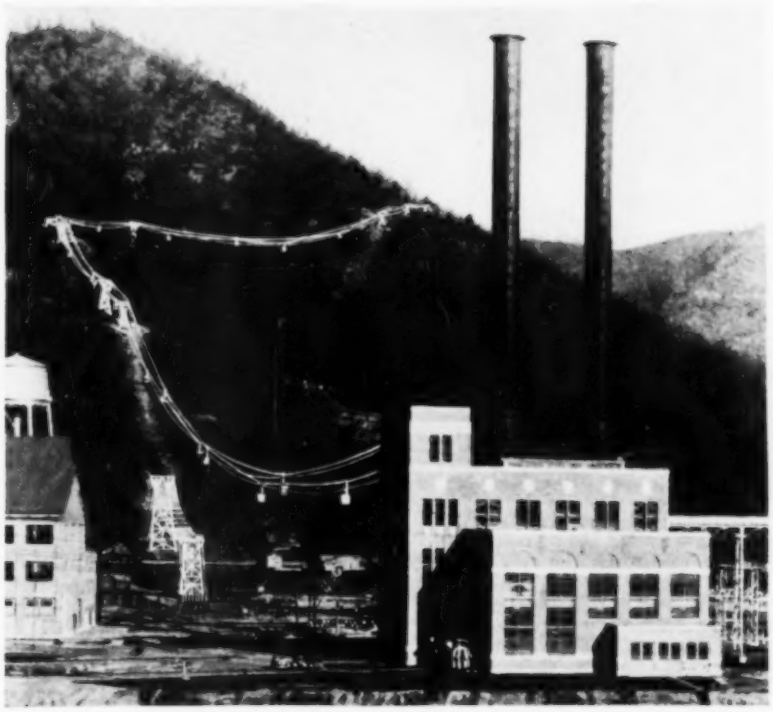
Du Pont "Cordura" High Tenacity Rayon

STRENGTH AT LOW COST

DU PONT

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Aerial tramways give low-cost transportation

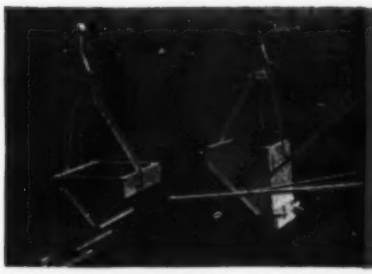


This 8,775 foot bicable tramway has been in continual operation for 23 years, transporting large quantities of coal at low ton-mile cost and giving dependable all-weather service.

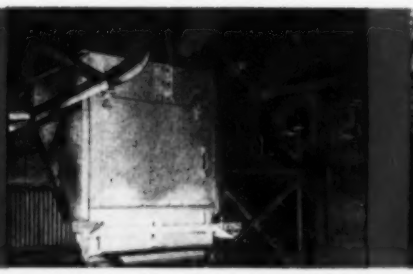
The tramway has two stationary track cables and a traction rope that moves continuously in one direction. Buckets clamp to the moving rope at 205 foot intervals and move at 500 feet per minute.

The 48 cu. ft. end dump buckets load and unload automatically. For loading, buckets detach from traction rope, run on graded rails, and attach again after being loaded. Detaching and attaching are also automatic.

This aerial tramway was designed and installed by the Tramway Division of U. S. Steel at the Alloy, West Virginia, plant of Electro Metallurgical Company, a Division of Union Carbide and Carbon Corporation.



Conveying materials for a few hundred feet or for several miles, Columbia-Geneva Tramways can be built to handle from 1½ to more than 300 tons hourly. They can be designed to meet almost every type of operating condition, and to handle many kinds of commodities easily and economically—from a tray of optical lenses to a carload of lumber.



Load carriers, like this one on a bicable tramway, are available in many different types and sizes. Services of Columbia-Geneva's Tramway Division include designing the tramway...supplying the steel...excavating for foundations and erecting support structures...furnishing and installing all wire rope, cables, and electrical and mechanical parts.

Tramway support structures are of many types, depending on terrain and job. Because of this flexibility, tramways are free of ground contour, roads, railroads, etc., are unhampered by bad weather, and can climb extremely steep grades. Other advantages: loads can be moved without rehandling and rights-of-way are easier to acquire.

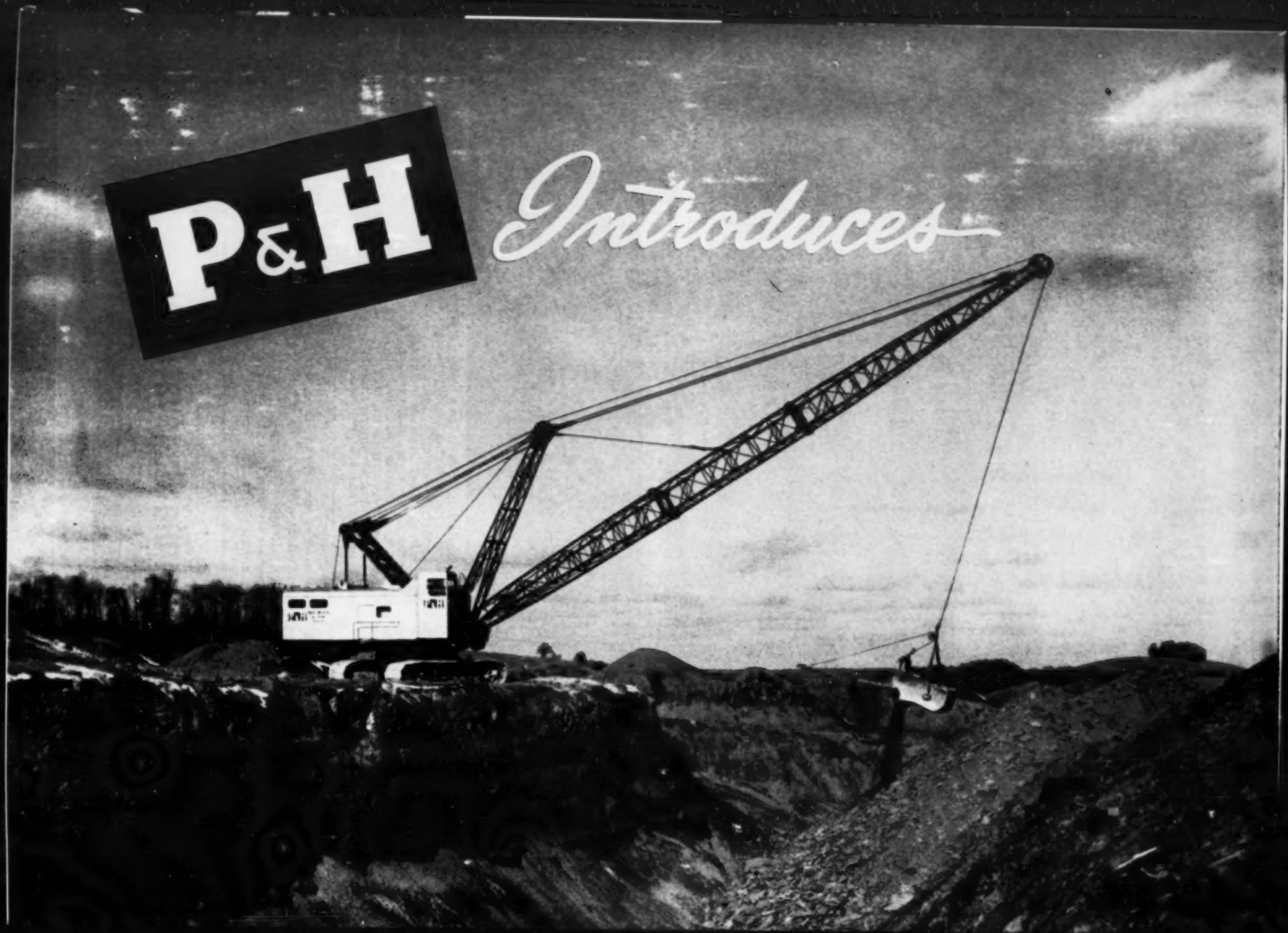
Send for this free manual on aerial tramways. Write on your letterhead today to the Tramway Division, Columbia-Geneva Steel, 141 Battery St., San Francisco 6, Calif. Or for an expert study of your transportation needs, ask for the services of a Tramway Engineer. He can show how an aerial tramway would pay off for you, and he can contract for its design and all phases of its construction, including materials.

Tramway Division

Columbia-Geneva Steel

Division United States Steel Corporation

UNITED STATES STEEL


P&H
Introduces

the 1855 diesel-magnetorque*

A NEW WINNER AMONG LARGE EXCAVATORS

This 1855, seen here in coal stripping, has a working weight of 600,000 lbs. It is handling an 8 cubic yard bucket on a 130 foot boom. It is readily convertible to a long range shovel with capacities up to 10 cubic yards depending upon application. Full details on request.

All operating motions by P&H Magnetorque — With years of successful experience, P&H has now applied the highly efficient Magnetorque principle to all operating functions on this new machine. Power, delivered by its own diesel engine or electric motor, is transmitted electro-magnetically through four separate Magnetorque units — for digging, hoisting, swinging and propelling. There are no troublesome friction clutches . . . no mechanical linkage between driving and driven members . . . no friction — no wear. The Magnetorque units last the life of the machine, assuring faster, smoother control far down through the years.

Mounted on a Single Pair of Crawler Frames — With all its power and capacity, the 1855 is surprisingly simple. As the largest machine of this type ever mounted on a single pair of crawler frames, it provides easier travel and maneuvering. Maintenance has been greatly simplified. Minimum time-outs mean more time for the big, steady production which results in lower tonnage costs.

For Open-Pit Mining, Stripping, Large Construction Jobs — The number of machines available during the next several years will necessarily be limited. Those looking for lower production costs in open-pit mining or large earth-moving projects should contact us promptly for full information.

* T. M. of Harnischfeger Corporation for electro-magnetic type coupling.

P&H LARGE EXCAVATOR DIVISION

HARNISCHFEGER CORPORATION

MILWAUKEE 46, WISCONSIN

the P&H *Line*

Why should you consider using

HERCULES® Red-Strand wire rope?

Why indeed. Aren't all wire ropes alike? They look alike. Why should you choose HERCULES Red-Strand rather than any other?

The answer would be easy if you could discover by *feel* why HERCULES Red-Strand performs so well. Or if you could see, or hear, or taste the *special quality* that makes users praise it so highly. But you can't. Wire rope isn't like that.

The big reason is performance

Usually you become aware of the consistently high performance of HERCULES Red-Strand by hearing users praise it . . . or by using it yourself and checking results.

Then you realize there must be *something special* about this rope. And you are right. *There is.*

What is this something special?

It is partly the result of generations of specialization. Leschen is concerned *entirely* with making wire rope. Nothing else. No other processes or activities interfere.

It is partly Leschen's 97 years' experience and Leschen's natural ability to make good wire rope . . . which has resulted in several major "firsts" in the development and most efficient use of wire rope.

It is partly pride of craftsmanship . . . from policy to engineering to finished rope. It is the effort always to make HERCULES Red-Strand *better than we claim it to be.*

In a word, it is *quality* . . . higher-than-rated quality. This is the *something special* in HERCULES Red-Strand wire rope that means *longer-than-expected* service . . . year in, year out.

It *pays* to choose HERCULES Red-Strand. Use it and see.

HERCULES® Red-Strand Wire Rope made by
A. LESCHEN & SONS ROPE COMPANY
St. Louis 12, Missouri

In business only to make wire rope and slings of higher-than-rated quality—since 1857

LESCHEN
SLINGS & WIRE ROPE
HIGHER-THAN-RATED QUALITY

Lower Maintenance is Just Plain Obvious with S-D "Automatics"

In these days of high material and labor costs, maintenance of equipment requires extremely serious consideration.

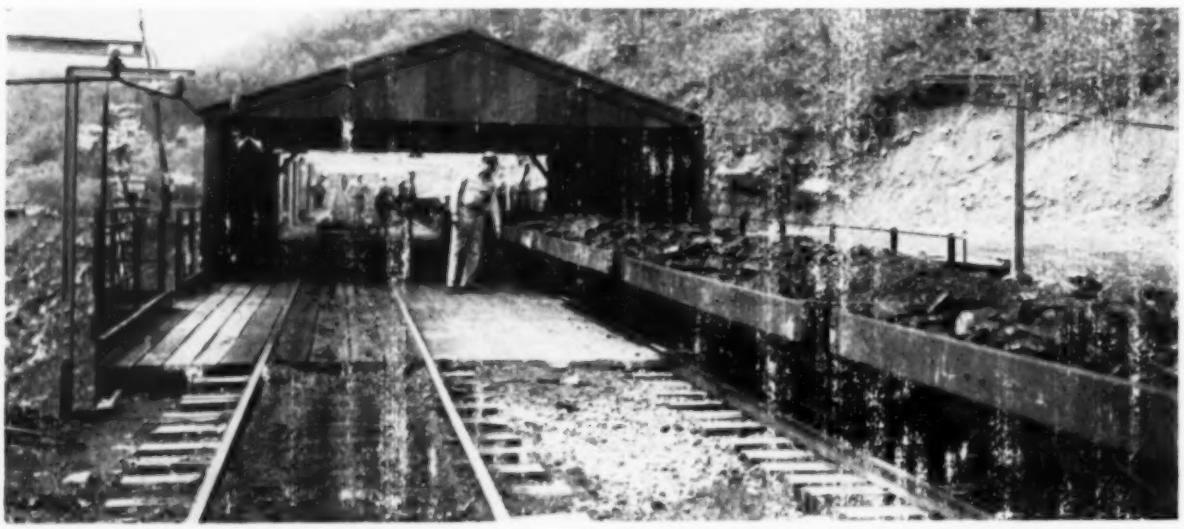
There are three plainly obvious reasons why your haulage maintenance cost will be greatly reduced with S-D Automatic Drop Bottom Cars.

1—FEWER CARS ARE NEEDED. With 50% less cars, maintenance cost goes down automatically. And, in addition, you drop off a locomotive or two. You use fewer cars because S-D Automatics dump faster, on-the-move. This means more trips, with less cars, per shift . . . and no waiting at the tipple—your surge bin takes the coal as fast as it comes out of the mine.

2—EASIER SERVICE ON S-D AUTOMATICS. Recent maintenance studies have clearly shown that shop repair time is almost double for other types of steel cars compared with drop bottom cars. At the same time, drop bottom cars haul over twice as many tons than either Rotary or End Dump cars. By its very nature of operation, S-D Automatic Drop Bottom cars just don't have to take the punishment required of other type cars.

3—BETTER CONSTRUCTION. You know that skimpy fabrication is false economy. You will find that S-D Automatics have the extra welding . . . extra rivets and extra reinforcing where it should be . . . cars designed and built up to a service requirement for longer life and less maintenance!

Reducing your maintenance cost is just one of the ways S-D Automatics save you money. With them, and an adequate Surge Bin, you get an efficient, balanced operation between the mine and preparation plant, saving additional thousands of dollars annually. Let us help you make more money with S-D Automatics!



Red Jacket Coal Corporation's Southern Belle Mine in Mingo County, W. Va. is another typical example of how modern mines are making a major reduction in coal production costs by installing the S-D Automatic Haulage System. At Southern Belle this modern haulage system comprises three 15-ton locomotives, 250 S-D Automatics and a 450-ton capacity Surge Bin.

SANFORD-DAY IRON WORKS

KNOXVILLE, TENNESSEE

Simplify mine and tunnel ventilation

Here's the airduct that can take it! Now you can deliver air to the working face of mine or tunnel — cheaper! That's because SPIRATUBE-M is built to cut maintenance costs! Ease of handling reduces installation costs. Unique SPIRATUBE-M construction features minimize leaks and seepage. And you get the maximum efficiency of your blower or fan . . . cutting power costs!

Immediately available in diameters to 30 inches, from fully-stocked distributors, SPIRATUBE-M is made in tough high count fabrics, all specially treated and heavily coated inside and out to withstand fungus, mildew and rough treatment.

And, patented, *built-in*, quick-couplers eliminate the need for separate parts . . . no need to look for couplers when you're in a hurry.

For heavy duty, pressure ventilation tubing without wire reinforcement, ask for AYRTUBE®. Sold in diameters to 36", AYRTUBE by itself or in combination with SPIRATUBE-M offers you an inexpensive airducting.

Check these features:

Handling ease

Lightweight

Flexible

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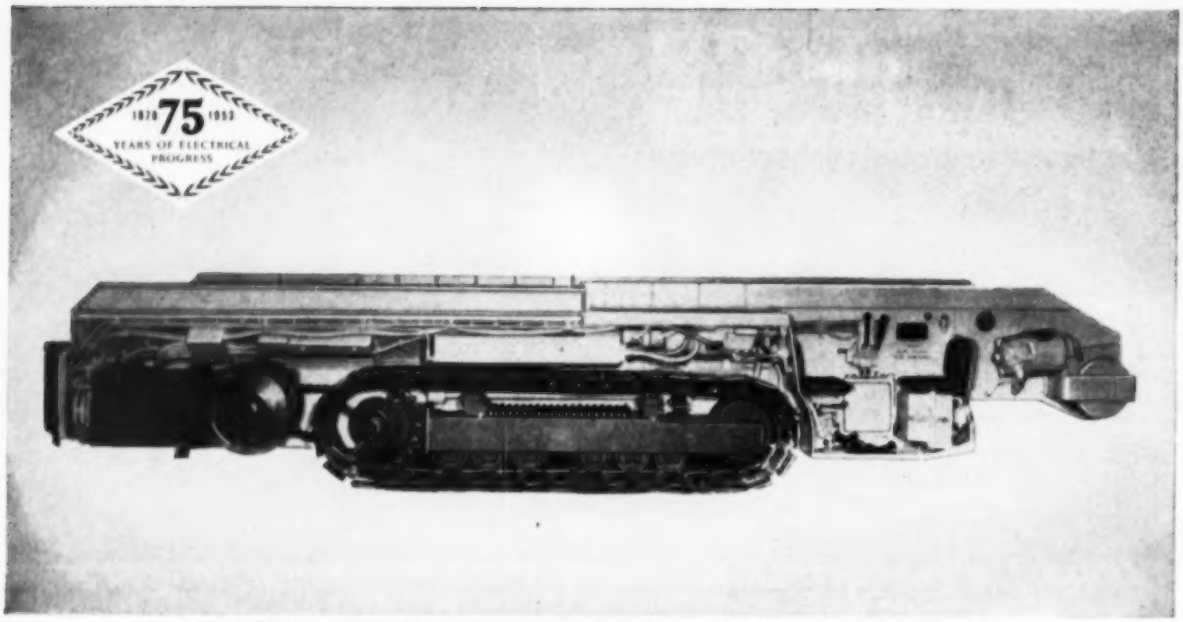

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Crawler treads on the G-E shuttle car make possible a wide conveyor, great carrying capacity, and excellent maneuverability either in passageways or at the loading machine. Ground pressure with the empty car is only 10 pounds per square inch. When fully loaded, using sideboards, the car still has only 20 pounds per square inch ground pressure.

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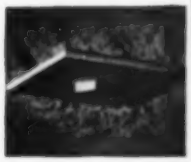

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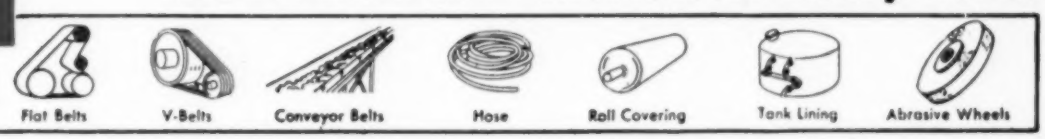

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Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

MARCH, 1953

IVAN A. GIVEN, EDITOR

How Much per Man?

WHAT'S THE MEASURE of profit-making ability? There are several, of course. One is the sales dollars received per employee per year. For a number of manufacturers, all of which did fairly well, sales income per employee was $12,000 to $20,000 in 1952—sometimes more. True, mining and manufacturing are different, and true also, this isn't the only measure of profit-making ability, but there is something to chew on in the fact that income per employee in the bituminous industry probably was not over $8,000 in 1952, with anthracite even less. Even if the industry had worked full time, with correspondingly firmer prices, income per bituminous employee probably would not have been much over $9,000.

Getting Income Up

One way of improving an industry or company position is raising prices. It goes without saying that that's out for coal—at least at the moment. What other answers are there? One is getting more production per employee. Can it be done? The answer is "Yes," even though it's not always easy. It's a job, first, of providing continuous-flow production with high-capacity equipment, and second, of making sure that that capacity is used to the fullest. Top management and management at the mine both have responsibilities and opportunities—one to provide machines and competent operating supervision, and the other to see that the machines are given a chance to produce at as near capacity as possible.

Proof in Practice

For some of the latest in proof that there are still major cost-cutting opportunities, consider, for example, three reports in this issue of *Coal Age*: longhole mining of pitching coal (p 76), faster drilling of overburden (p 80), and methods revisions at an established mine to boost an already high efficiency substantially. (p 88). They all involve either new primary production units or new auxiliary equipment to enable the primary units—and the men operating them—to get a lot more done per hour of working time. Whatever the measure of profit-making ability, the surest way to results is through steps like these.

What's Fair?

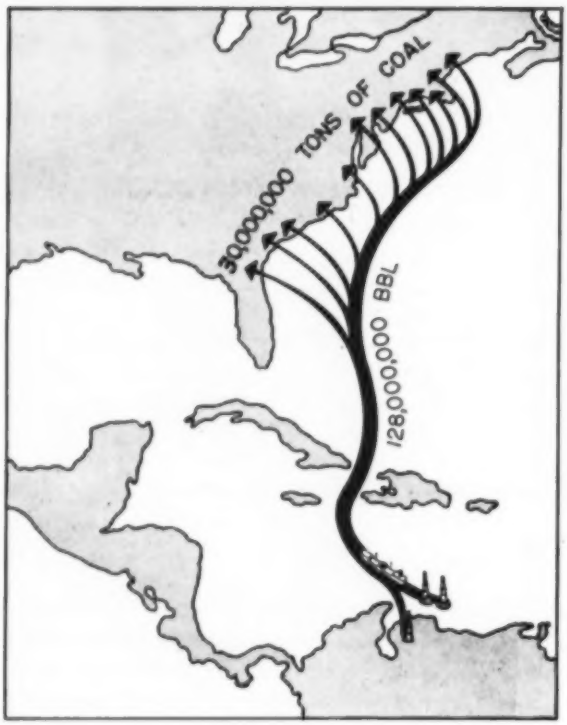
"I FURTHER RECOMMEND that the Congress take the Reciprocal Trade Agreements Act under immediate study and extend it by appropriate legislation. This objective must not ignore legitimate safeguarding of domestic industries, agriculture and labor standards." — *President Eisenhower, in his State of the Union message to Congress, Feb. 2.*

If there is any industry that needs safeguarding against unfair competition from foreign products, it is the coal industry against imports of residual fuel oil to the East Coast. That foreign tide flooded up to 128,000,000 bbl in 1952, equivalent to over 30,000,000 tons of coal and practically all dumped to get rid of it at whatever it would bring.

Less the Answer

The why, the how and the damage not only to the coal industry but to national security and the wellbeing of the country are detailed in the article starting on the next page. The strength of the flood is such that the subject of "What's fair?" has only one answer: A lot less than is coming in now and is scheduled for the future.

There are two major answers: (1) reduction in imports and (2) further pressure to reduce the cost of coal. Both are essential, but until coal can push to completion its cost-cutting work it must have protection against unfair competition that reduces its revenue, loses working time and wages for its employees, and makes its cost-cutting job appreciably harder by reducing its markets. The immediate need is stemming the tide of residual from overseas. That is a job for Congress. Coal naturally must help by seeing that Congress understands the facts and the need for action—now.



Here are the facts on imports of residual fuel oil:
Where it comes from
Who uses it
How it's priced
The future outlook
Plus . . .
A plan of action for Congress and coal men

Foreign Oil . . .

How It Hurts America

How It Can Be Curbed

OVER 15,000,000 BBL OF RESIDUAL FUEL OIL from foreign shores poured into the East Coast ports of the United States in December, 1952. Total for the entire year was close to 128,000,000 bbl—nearly three times as much as flowed in in 1946 and the equal of over 30,000,000 tons of bituminous coal.

That tide of residual, still strong in 1953, leaves a wide swath of damage.

It weakens America's coal industry.

It robs American coal miners, railroad workers and oil workers of jobs, working time and wages.

It undermines our Nation's self-sufficiency.

There's no end of the flood or the damage in sight—no end, that is, unless these steps are taken:

1. Bring the facts about imports and their effects to light.

2. Take the necessary steps to protect the Nation's economy.

Dumping should and must be curbed—by legislation, if necessary. If it is curbed until the coal industry can push to completion its work in cutting mining and transportation costs, the Nation will gain immeasurably in economic strength and will have a stable supply of low-cost fuel.

Coal is the industry that stands to take the greatest immediate and long-term loss, and coal men rightfully should take the initiative in bringing out the facts, rallying others who prize our strength and sounding the alarm in the halls of Congress—the only hope of stopping the tide now.

The issue and the choice are clear:

Shall the United States pursue a policy that impairs its strength while enriching other nations and a few oil companies with foreign holdings?

Or shall our Nation shape a policy that strengthens us by assuring development of our own oil and coal—the basic energy sources on which we must pin our hope if war comes?

In these dangerous years, there can be no choice. It's time now to act.

Action must be based on facts. The facts lie in the answers to the following questions:

Where does imported residual come from? . . . And why the recent upsurge?

Who uses imported residual? . . . And for what purposes?

Who gets hurt by the big import flood?

What's the price structure?

What's the outlook for the years ahead?

Where Residual Oil Comes From

NOBODY QUARRELS SERIOUSLY about coastwise shipments of residual from the Gulf to Atlantic Seaboard ports. To begin with, it flows from American refineries running mostly American crude oil and employing American workers. Secondly, it doesn't bulk too large—only 60,379,000 bbl in 1951 and an estimated 60,400,000 bbl in 1952, or less than half of foreign imports.

Nor is residual from the West Coast a real threat now. Though there was some movement from there to the East Coast in 1949 and early in 1950, the outbreak of trouble in Korea stopped that flow.

The real trouble has its seat in Venezuela, Aruba and Curacao. That one South American nation and those two islands in the Netherlands West Indies account for the bulk of residual and crude imports coming from foreign shores to the Atlantic Seaboard. By and large, oil wells and refineries there are owned and operated by American interests.

The reason residual now pours into our East Coast in such quantities is two-fold:

1. Oil activity in the Caribbean area has grown tremendously.

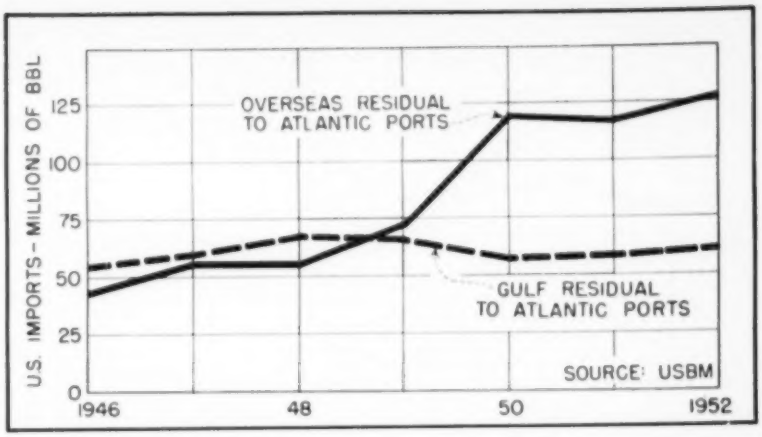
2. Refinery capacity in Western Europe has increased rapidly.

Oil is booming in the Caribbean area. In 1951, for instance, crude output in Venezuela averaged 1,705,000 bbl per day; in 1946, 1,065,000; in 1938, only 516,000. In 1938, less than 5% of native crude was refined in Venezuela; in 1951, 18.3%.

Here in the United States, where thermal refineries operate at high efficiency and catalytic cracking plants in growing numbers wring more high-order products from crude, only 18 to 19% of crude throughput comes out as residual to compete in heavy industrial markets.

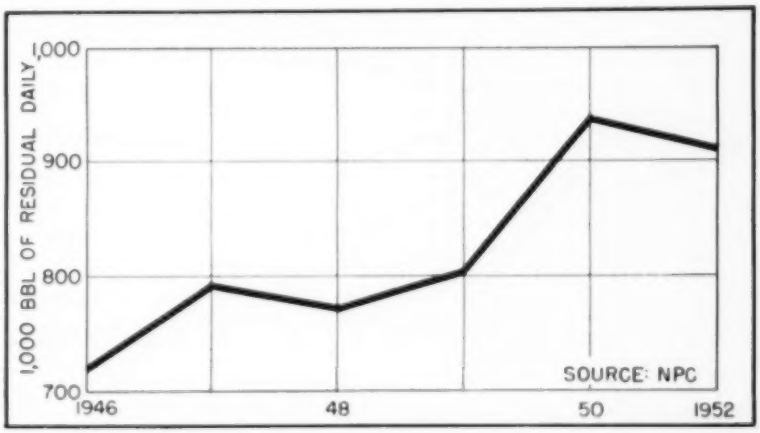
But in the Caribbean and South America, production of residual per barrel of crude throughput runs much higher. In 1951, Venezuelan refineries yielded 65,131,000 bbl of residual—57% of total crude throughput. This was an improvement over 1949, when refineries there yielded 65% residual. But it's still a lot of residual by American refinery standards.

Elsewhere, in Aruba and Curacao, crude runs to stills in 1951 totaled



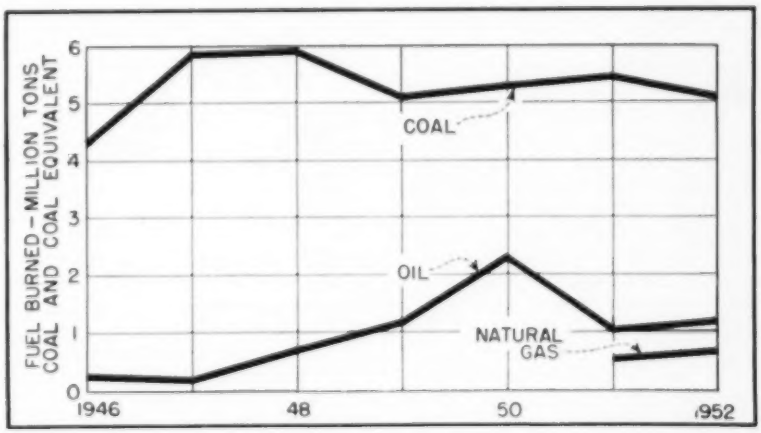
Foreign Flood . . .

FIG. 1—Foreign residual imports to East Coast territory rise rapidly while Gulf Coast shipments hold steady.



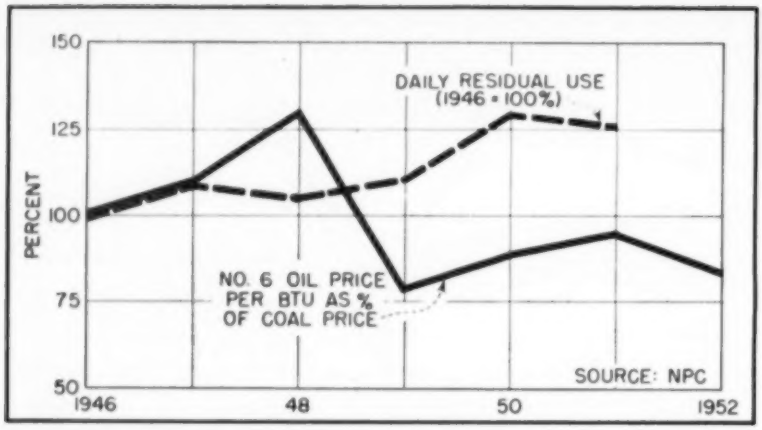
Boosts Residual Use . . .

FIG. 2—How residual oil use has increased along the Atlantic Coast and inward to Appalachian territory.



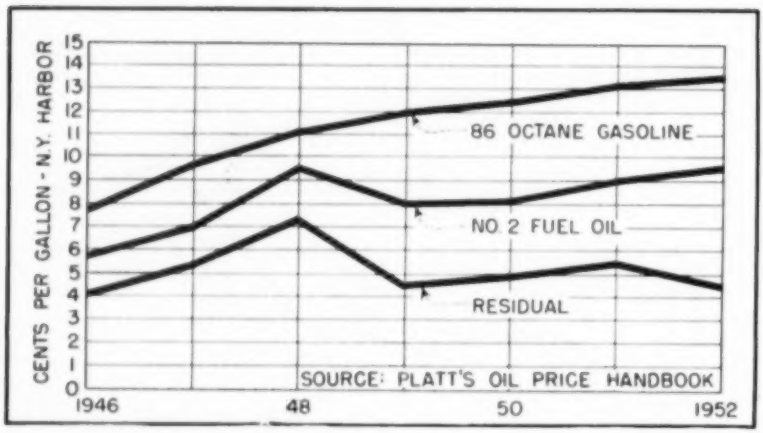
And Stimulates Switching

FIG. 3—How Consolidated Edison has varied its consumption of coal, oil and natural gas in its New York plants.



Use Reflects Price Cuts . . .

FIG. 4—How residual use rises along Atlantic Seaboard with price reductions.



Added to Other Products

FIG. 5—How cuts in residual prices are accompanied by rises elsewhere.

309,401,000 bbl; in 1946, 230,094,000; in 1938, 172,614,000. Residual output in 1951 was 201,088,000 bbl—about 65% of crude throughput. This yield of residual was even higher than in 1949, when only 59% of throughput came out as residual.

While residual production in Venezuela, Aruba and Curacao rose from 157,277,000 bbl in 1946 to 263,693,000 bbl in 1951—an increase of 67.6%—imports to the East Coast of the United States in the same period rose from 44,644,000 to 119,166,000 bbl—a 167% jump—and continued through 1952 with an estimated 128,000,000 bbl. (Fig. 1).

Why the big increase from 1946 to 1952, out of all proportion to the rise in residual produced in Venezuela and the Caribbean?

Major reason is the growth of refinery capacity in Great Britain and Western Europe, where the bulk of refinery throughput now is Middle East crude. Here's how crude runs to stills, reflecting refinery capacity, increased in Western Europe from 1946 to 1951:

	1946	1951
	(1,000 bbl per year)	
France	20,588	136,108
West Germany .	2,485	34,455
Italy	301	54,511
Netherlands	3,803	50,386
Great Britain ...	15,700	120,905

With residual output averaging about 42% of crude throughput, the increase shown above enabled the five nations listed to boost their production of residual between 1949 and 1951 from 71,658,000 to 173,031,000 bbl. In fact, in 1950 alone, throughput of Western European refineries grew 52%. In that same year, imports of foreign residual to the East Coast of the United States, coming almost entirely from the Caribbean area, jumped to 120,025,000 bbl, against only 74,100,000 in 1949.

The point is this: As refinery activity in Western Europe has gathered speed, providing more residual for home consumption, Caribbean residual that once found a lush market in Europe now floods our Atlantic Seaboard, seeking markets for increased volumes.

Who Uses Residual?

MAJOR IMPACT OF IMPORTED RESIDUAL on coal is felt on the East Coast. There it shows up in depressed prices for residual produced in seaboard refineries and in depressed prices for coals from eastern fields, which must meet the competition of residual or get out of the market altogether.

But the effects also extend farther back and eventually into the Midwest. If there were no imports—or if there were even a reasonable quantity of imports—residual produced in those regions would find some of its markets farther afield. Instead, domestic residual is dammed up in the areas where it is produced, seeks markets at distress prices and displaces coal.

According to the National Petroleum Council in a special study of residual released Dec. 9, 1952, use of residual from 1946 to 1951 in the East Coast and Appalachian regions (PAW Districts I and III) increased from 263,530,000 bbl per year to 334,340,000—a rise of 27% (Fig. 2). The big customers, shown in Table I, were heavy industries, ships and tankers, space heating and the electric utilities—the very customers, except the bunker trade, on which coal must pin its hope for present strength and future growth.

While use of residual in District I and III was increasing 27%, as stated above, and while production of residual in those districts rose only 9.3%—from 86,623,000 to 94,749,000 bbl per year—imports or residual moved up nearly 175%. That's a flood by any definition.

Take it another way:

Here's what happened in the District of Columbia and 11 states lying north of Cape Hatteras—Virginia, Maryland, Delaware, Pennsylvania, New Jersey, New York, Connecticut, Massachusetts, Rhode Island, New Hampshire and Maine. In that region in 1946, 161,780,000 bbl of residual was sold for all purposes; in 1951, 246,436,000 bbl. In 1946, the quantity sold in that area was only 33.5% of total sales of residual in the United States; in 1951, 44.6%. In short, because of the flow of residual imports, the East Coast is burning a larger and larger share of the available residual, at coal's expense.

Take an individual coal customer: In 1948, as Fig. 3 shows, Consolidated Edison, New York City, burned 5,951,347 tons of coal and a quantity of oil equal to 747,989 tons of coal. At that time, the price of oil per Btu on the East Coast was 131% of the price of coal (Fig. 4). In 1949, when residual on the East Coast sold for only 80% of the price of coal, Con Edison's coal burn dropped to 5,162,460 tons and oil use rose to equal 1,206,229 tons of coal. In 1950, with oil wholesaling at 89% of the price of coal, the utility burned 5,374,942 tons of coal and upped its oil burn to the equivalent of 2,347,203 tons.

In 1951, Con Edison first began to use natural gas under its boilers. In that year, with oil selling only slightly below coal on a Btu basis, coal use held fairly steady at 5,472,667 tons and the company burned oil equal to 1,121,121 tons of coal and natural gas equal to 610,794 tons. In 1952, with price cuts putting residual at some 84% of the price of coal, coal use fell to 5,176,308 tons while residual equal to 1,161,925 tons and gas equal to 777,507 tons was burned.

As an indication of how quickly a utility can respond to price changes, here's what happened in August, 1952, when residual in New York harbor dropped 35c per barrel. Con Edison's coal use in that month fell off to 388,008 tons from 421,636 tons in July, while oil use rose from 53,619 tons of coal equivalent to 99,472 tons. The trend continued through September, with a burn of only 377,184 tons of coal and a quantity of oil equal to 114,968 tons of coal.

What's the Oil Price Structure?

RESIDUAL IS A BY-PRODUCT of oil refineries. The general rule appears to be: "Sell it for whatever it'll bring, but sell it—and fast."

According to the NPC report on residual, with the price of crude oil $1.40 per barrel at the well in 1946, residual sold at the refinery for $1.35 per barrel—96.4% of the value of crude. In 1951 and far into 1952, with crude selling at the well for $2.53, residual at the refinery brought $1.85—only 72.5% of the value of crude.

If you're a refiner, you want to squeeze as much value as you can from every barrel of crude. The best way to do that is to refine as much of it as possible, even at additional cost, and produce a minimum of residual. That's why American refiners, at considerable investment of capital, year after year have turned out less residual per barrel of crude. In 1946, the average yield of residual per barrel of crude was 24.9%; in 1951 19.7%; in 1952, an estimated 18.5%. The more finished products they've made, the less they've needed to charge for their residual.

Even so, with crude runs to stills increasing every year, residual output also has moved upward.

What can refiners do with growing quantities of residual? They can't store it, because storage costs per unit of value are too high. Besides, as spring draws near, they need more and more storage space to meet peak demands for motor fuel in the spring and summer. Since they can't store it, they must get rid of it.

If the market for residual is weak—as it well may be when cheap foreign residual enters American ports in quantity—the price falls below the equivalent price of coal. That's especially true on the Atlantic Seaboard, where residual prices are extremely sensitive to competition.

Briefly, here's the history of residual pricing in recent years:

Through World War II and on through 1948, fuel demands were high and coal and domestic residual found strong markets. In those years, according to NPC, residual imports ranged from a low of 17,700,000 bbl in 1942 to a high of only 56,472,000 bbl in 1948—an average of about 39,500,000 bbl per year. Meanwhile, the wholesale price of residual per Btu ranged from 102 to 131% of the wholesale price of coal and averaged 110.5%.

But the picture changed in 1949. In that year, residual imports rose to 80,684,000 bbl—an increase of 43% over 1948—and the wholesale price dropped to 80% of the wholesale price of coal. In 1950, with residual imports at 125,525,000 bbl, residual sold at 89% of the price of coal. And in 1951, when residual slacked off slightly to 124,877,000 bbl, residual prices were 96% of coal prices.

Exact price data for 1952 are not yet available but there can be no doubt that with residual imports up again to nearly 128,000,000 bbl, with one cut of 35c per barrel effective in August, 1952, and a second drop of 5 to 11c effective in January, 1953, and with higher coal costs growing out of the new wage agreement signed last September, residual now is selling well below the price of coal on the East Coast. In fact, a spot check reveals that in January, 1953, at New York City, heavy fuel oil sold at 84% of the price of West Virginia high-volatile coal on a Btu basis. The truth is, as one big fuels buyer reported in January, "Residual is running out of our ears."

One reason why the price of residual can fluctuate freely to meet the price of competing fuels is that oil refiners can offset losses on residual by asking more for high-grade petroleum products—that is, they could until early 1951, when federal controls fixed ceilings. From 1948 to 1949, for instance, the price of No. 6 fuel oil in New York harbor dropped from 7.2c per gallon to 4.6c (Fig. 5). In the same period, 86-octane gasoline rose from 11.26 to 12.02c per gallon. While the price of No. 6 fuel oil stayed low from 1949 to 1950—rising only to 5.05c in 1950—86-octane gasoline climbed to 12.64c. By 1951, with No. 6 fuel oil at 5.6c, gasoline had risen to 13.22c, where it leveled off under OPS controls. Meanwhile, from 1950 to 1951 the New York harbor price of 50-cetane diesel fuel rose from 8.8 to 9.55c per gallon and No. 2 fuel oil from 8.35 to 9.15c per gallon.

What makes foreign residual cheap? There are several reasons, as follows:

TABLE 1—Who Uses Residual in the East and Appalachians

CONSUMPTION

(1,000 bbl per year)

	1946	1951	Per Cent Change
Smelting, mining and manufacturing	53,181	81,323	+52.9
Vessels	70,847	80,227	+13.2
Heating	27,923	49,713	+43.6
Electric utilities	18,141	38,945	+114.7
Oil companies	29,967	27,229	—8.8
Railroads	33,726	20,331	—39.7
Military	17,484	18,579	+6.2
Gas utilities	16,389	9,042	—44.8

1. Oversupply growing out of low-efficiency refinery operations in Venezuela and the Caribbean and loss of markets in Western Europe – As pointed out earlier, the tide that once flowed from the Caribbean to Western Europe now is diverted to the United States East Coast. Meanwhile, with increasing runs of crude to stills and a high percentage of residual yield, Caribbean refineries are turning out immense quantities of residual. In August, 1952, Caribbean Bunker "C" oil fob Aruba sold for $1.50 per barrel; American Bunker "C" fob Houston, Texas, $1.85.

2. Low-cost exploration and production—Venezuela is a rich but almost virgin field. Therefore the odds on bringing in productive wells are more favorable than in the United States, where possible fields are pretty well worked over. Besides, production per well in Venezuela is bountiful. These factors, coupled with cheap labor, make Venezuelan oil relatively cheap.

3. Low tanker rates—Only American-flag vessels are permitted to ply the coastal trade. They're the ones that bring oil from the Gulf to East Coast ports. They're bound by rigid and costly rules and pay high wages to their seamen. But vessels carrying any flag may bring oil from across the seas to United States ports. Foreign-flag vessels are not bound by the same rules and wage scales and their break-even point therefore is far below that of American-flag vessels. If the going gets rough, they can slash their rates far below those of American vessels and still stay in business.

That's why a good many American-flag tankers now are laid up on the Atlantic Seaboard—and have been since September and October.

Data from Dietze Co., Inc., ships' brokers, New York City, show that in 1951 tanker rates per ton of residual moving from the Netherlands West Indies to ports north of Cape Hatteras averaged $5.40 for the year, with a high of $8.10 in January and December and a low of $2.57 in May. Those rates reflect the normal rise and fall in winter and summer.

But in 1952, the average rate for the year was $4.14, with a high of $8.10 in January and a low of $2.47 in October. In short, competition for business among tankers was so severe that rates failed to rise with the onset of fall and winter. Whereas rates in the last 3 mo of 1951 averaged about $6.67, in the same period of 1952 they averaged around $2.56. The difference between $6.67 and $2.56 is roughly equal to 50c per barrel in the cost of moving residual from the Caribbean to the East Coast. At that rate, it's easy to lop 10 to 35c per barrel off the price of residual.

Who Gets Hurt?

RESIDUAL AT "DUMP" PRICES in large quantities hurts five ways. Here's where the damage is done:

1. The coal industry.
2. The domestic oil industry.
3. The railroad industry.
4. The shipping industry.
5. National security.

The coal industry—Displacement of over 30,000,000 tons of coal in 1952 by imported residual can't be passed over lightly. For mining companies, it's a loss of some $150,000,000 of revenue at the mines—for many companies, the difference between making a fair profit and running in the red.

For miners, it's a loss of some $90,000,000 in wages—that much of the $150,000,000 would have jingled in their pockets. It also means wiping out jobs for 21,000 miners, or the equivalent in lost working time.

The domestic oil industry—The American oil industry cannot thrive and grow strong while submerged in a flood of cheap imported oil—whether crude, residual or refined products. To keep pace with projected demand for petroleum and its products, the oil industry must drill more wells every year. To drill those wells, the industry must have money.

The Independent Petroleum Producers' Association estimates domestic demand at 8,500,000 bbl per day by 1955. To meet this demand, 9,600,000 bbl per day of capacity for crude oil and gas liquids will be needed. To reach this capacity, 58,000 wells will have to be drilled in 1955 alone, against some 43,000 in 1951.

Well-drilling activity, the IPPA explains, runs along with the rate of production and the price of crude—the two factors in income. The IPPA contends that for every 1,000 wells, the industry needs $200,000,000 in gross income from crude. This $200,000,000 can be provided (1) by adding 8 to 9c per barrel to the price of crude or (2) by cutting back imports and increasing domestic production by 200,000 bbl per day.

The IPPA goes on to say that domestic oil producers will need income of $8,330,000,000 in 1955 for all purposes, including drilling. Assuming that 1952 price levels continue, that imports are banned and that domestic production equals demand, the industry can expect production to increase to 8,680,000 bbl daily and gross income to be $7,360,000,000–$970,000,000 short of actual anticipated needs. Assuming that imports level off at the 1950 rate, domestic crude production will average only 7,830,000 bbl per day. In that event, the industry would be $1,720,000,000 short of its dollar needs. Finally, assuming that imports continue to rise at the rate of the past several years and that domestic production accordingly is held to a 7,100,000-bbl-per-day level, the deficit will be $2,370,000,000—a whopping gap that would very nearly paralyze drilling.

This last assumption may well become fact. From 1946 through 1952, daily average production of crude in the United States rose only 31%—from 4,750,000 to 6,202,000 bbl—while average daily imports of crude and products, including residual, increased 148%—from 377,000 to 936,000 bbl. Meanwhile, drilling activity in the United States increased only 50%—from 30,000 wells in 1946 to some 46,000 in 1951.

In short, imports slow down exploration for petroleum as well as production in the United States.

The railroad industry—Figured on average freight charges per ton of coal, displacement of over 30,000,000 tons of coal by imported residual took from railroads some $95,000,000 in revenues that would have been earned by hauling coal, to say nothing of railroad workers who went on short working time or disappeared from railroad payrolls.

The American merchant fleet—American tankers, as pointed out earlier, are being squeezed out of the Caribbean oil traffic by cut-throat competition from foreign-flag tankers. Some still are operating, but at losses that are only slightly less than laying-up costs. The situation strikes at the heart of our merchant fleet, which must be the backbone of transport if war should come.

National security—In the explosive world we now live in, to rely on imported fuels, subject as they are to the perils of sea transport, is to play fast and loose with our self-sufficiency and national security. At the start of World War II, Germany put a fleet of only 60 submarines to sea. With those, the enemy played havoc with coastwise and Caribbean shipping. Now, in 1953, the Soviet Union is reported to have over 300 submarines in readiness. Need more be said?

What's the Outlook?

THE OUTLOOK IS GRIM, any way you see it. Sure, war would change it. But that would be grimmer still.

Here are the facts in the outlook:

1. Refineries in Western Europe can be expected to boost their capacity still more as the European defense program moves forward. Thus more Caribbean residual may be diverted to our East Coast.

2. If ever the big refinery at Abadan, in Iran, goes on stream again, there will be still more residual seeking world markets.

3. There's nothing in the picture to suggest that refineries in the Netherlands West Indies and Venezuela will cut back operations—certainly not as long as their products can undersell American products. Moreover, the Venezuelan government provides a favorable political climate for foreign capital investment, with special tax inducements for refining crude on the scene. That climate foreshadows even higher production of residual.

4. As long as residual output runs high, tankers will compete for business. That means continued low tanker rates from the Caribbean to Atlantic Seaboard ports and low prices for residual.

5. Though there's now no great excess of residual on the West Coast, an end of the Korean war would release large quantities of residual in California. In that event, as in 1949 and early 1950, residual again might move from the West Coast to Atlantic ports.

6. Growth of the Canadian oil industry and increase in refinery capacity there shape up as another threat to American coal producers.

7. If the price of residual moves at all in the next few months, it's more likely to move down than up. The reasons are: (1) residual was in such plentiful supply in December and January that spot buyers could get all they wanted at 12 to 14c below the posted price of $2 per barrel; and (2) with February and March the busy months for storing motor fuel against summer demand, East Coast refineries and storage-tank owners will clean their tanks of residual, at whatever price it will bring, to make way for high-quality petroleum products.

8. The railroads are in no position to help coal by cutting freight rates—or if they are in position, they're not inclined to move.

9. With rigid freight rates and a high floor under wages, coal faces a tough—though not insurmountable—job in its efforts to cut delivered prices and restore markets lost to residual.

What's the Answer?

THE TANGLED WEB of national and international policy, together with conflicting corporate and individual interests, makes it hard to shape a plan that will be best for all. The elements in the picture are:

1. Commitments by the United States to stimulate world trade, foster the Good Neighbor policy and encourage American capital abroad.

2. For hemisphere security, the need to develop to the fullest all the resources lying to the south of the United States.

3. The need for adequate markets for Caribbean and South American petroleum and products.

4. For our own national security and prosperity, the need for keeping our basic industries strong, our employment at maximum and our wages adequate to a high standard of living.

The question is: At what point do these commitments, these needs and our help to other nations begin to hurt us? Specifically, at what point does imported oil begin to supplant rather than supplement domestic fuels?

Exactly where that point is, nobody knows. But there can be no doubt that we already have far overstepped the danger mark.

Something must be done—and can be done—before the damage becomes worse. Congress has a major responsibility, along with coal men and others interested in promoting the economic strength of the Nation. Among the things that Congress can and should do are:

1. Limit oil imports to a percentage of domestic oil output.

2. Fix import duties that will give coal a fair chance at its rightful markets.

3. Make residual imports conditional upon additional refining in catalytic crackers on the East Coast—or elsewhere in the Nation.

Coal of course should take the initiative in the fight on unfair competition from foreign oil. Here are some of the things coal men can do:

1. Rally other interested groups and enlist them in the cause. These other groups include the UMWA, railroad operators and workers, independent oil producers and refiners and their employees, and American shipping.

2. Publicize the issue in local communities, especially where foreign oil is taking its greatest toll.

3. Urge Congress to act favorably on proposals to curb unfair dumping from foreign shores.

4. Put even more effort behind programs designed to cut the cost of using coal. Protection against unfair dumping is vitally necessary. So also is maximum service to the consumer. The two go hand in hand. Laying down coal at East Coast points—or anywhere else in the United States—at a price that will win and hold large fuel users requires moving fast on three fronts:

Mining Costs—Coal has made measurable and gratifying headway in cutting mining cost. But there still is room for significant improvement through the use of new machines and new techniques. The goal should be a reduction in the order of $1 per ton or more. Nothing less will help much.

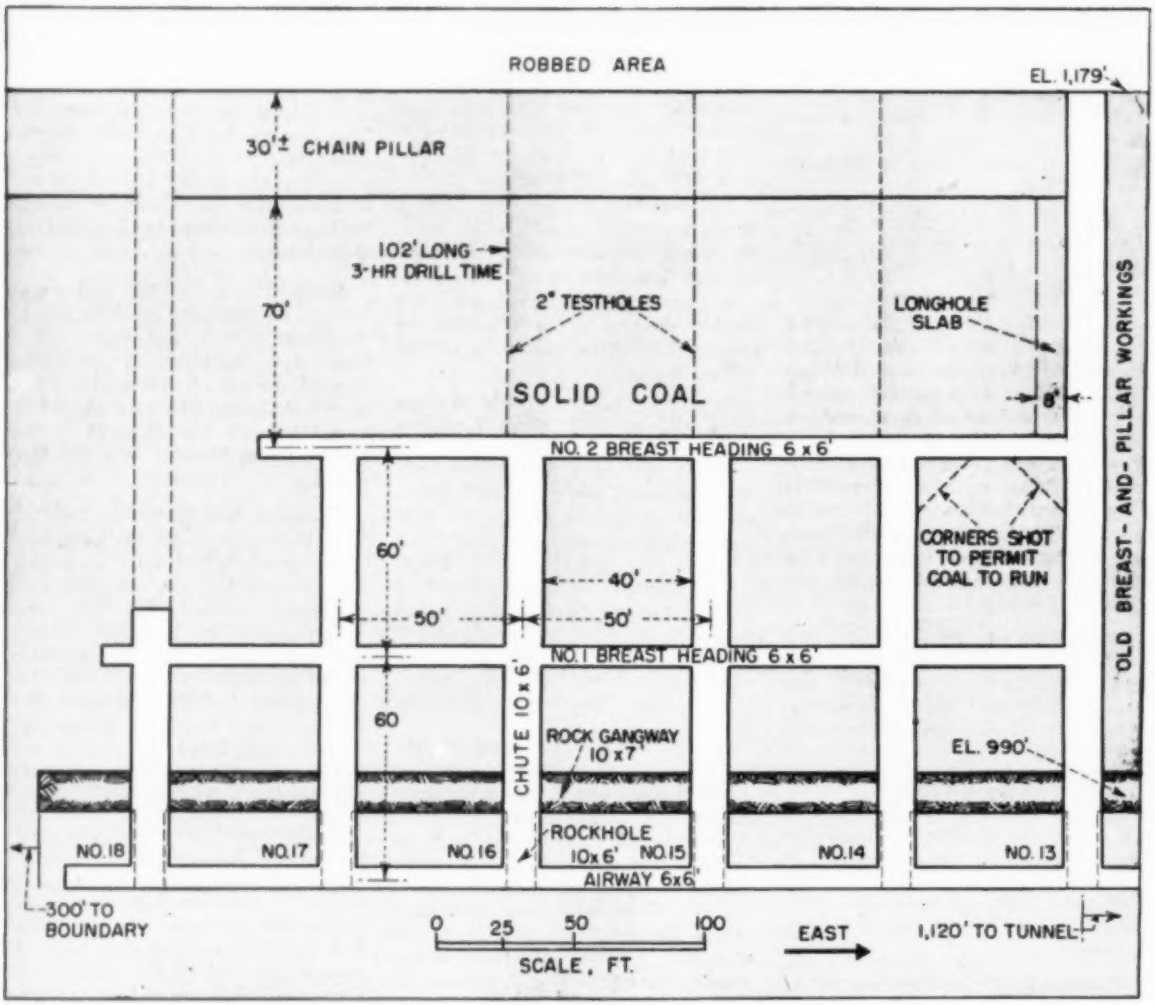
Transportation Costs—The railroads have their own problems. Coal can't expect much help from that quarter. But the door isn't shut on other ways of moving coal to market. Two promising prospects are long-distance belts and pipe lines. Thus far, however, coal's participation in research and development looking to belt and pipeline transport has been limited. On both projects, the needs are big money, a wider share in research and, above all, speed.

Utilization Costs—Wringing more useful Btu's from a pound of coal is not the consumer's problem alone. It is also the problem of every coal producer who wants to sell his output. But the fact remains that over the past years most of the advances in design and efficiency of heavy burning equipment must be credited to coal users and their engineers, with coal men moving in to a somewhat limited extent only in recent years.

The time is at hand for coal producers to play a bigger role in this field. That means establishment of industry-wide and company engineering services to steer coal's customers toward higher efficiency, and also generous support for coal's research agencies. With coal wholesaling in New York at close to $10 per ton, including freight and handling charges, a 5% boost in burning efficiency is equal to a cut of 50c per ton. If 50c a ton can save a big customer, there is good reason for a real effort to achieve it.

Coal has a big assignment in cutting the cost to consumer. It is coal's problem and the time to act is now. It can solve it if it has the opportunity—and with reasonable speed. But it must have that opportunity. Therefore:

Unfair dumping of foreign oil must be curbed.



DEVELOPMENT FOR LONGHOLE MINING includes chutes and rockholes on 50-ft centers to feed coal to rock gangway and airway and breast headings on 60-ft centers to provide set-up opportunities for the air-operated rotary drill.

How Longhole Mining Increases

The Job . . .

Using an air-operated unit to drill long holes for recovery of a vein pitching 45 deg

The Place . . .

Park No. 1 mine, Alpec Coal Co., Mahanoy City, Pa., in the 14-ft Holmes vein

And the Benefits . . .

Increased safety, higher recovery, less physical strain, bright prospects of lower mining costs

By HAROLD DAVIS
Assistant Editor, Coal Age

LONGHOLE MINING in the 14-ft Holmes vein at Park No. 1 mine, Alpec Coal Co., Mahanoy City, Pa., according to Albert Peca, president and general manager, offers several distinct advantages in recovering pitching anthracite:

1. **Safety is increased** because the men no longer are required to drive development openings up the pitch to the limit of the lift being recovered.

2. **Tons per man at the face,** a basic measure of productivity, are increased, thereby reducing the cost of face labor, which accounts for as much as

APPROXIMATELY 200 FT PER SHIFT, 2-in hole, is normal duty for the 2-man drill crew. Auger sections (right photo), are added to the string as needed. The drill is equipped with a 9-ft post and 7-ft treadbar and has a feed rate of 3 fpm.

LONGHOLE COAL, shown in transit at the top of the rockhole in the left photo and loading into the car (right), is cleaner, larger in average size and less troublesome at batteries since there are fewer props in coal openings to interfere.

Safety and Efficiency

60% of the payroll in many instances.

3. Recovery percentage shows a marked increase because of the faster rate of extraction and because the coal is not chopped into pillars which might be lost as a result of squeezes.

4. Timber requirements are proportionately reduced and the cost of installing such timbers is saved, since the upper portion of the lift is not penetrated, except by chute extensions to the old workings as explained later. Furthermore, retimbering is not necessary in view of the rapid extraction.

5. Fewer timbers in the coal openings eliminates much of the blockage that occurs at main and check batteries in conventional mining when the dislodged timbers become wedged in the batteries and require shooting to start the coal flowing again.

6. Size consist is improved because the good breakage achieved in the longhole shots eliminates the need for "plugging" large lumps at the battery. Thus, there is less need for frequent shooting at the battery which reduces the coal to dust. As a corollary, total explosives requirements are lower in longhole methods.

7. Dilution of the coal by roof rock has been reduced, early experience shows. At one chute, 484 cars of longhole coal had been withdrawn up to the time the mine was visited and rock had not yet shown up at the battery.

LONGHOLE METHODS

The longhole project is in the south dip of the Holmes about 50 ft above the axis of the basin. The coal is being recovered from a 220-ft lift between the active level and the robbed level above. Pertinent elevations are 1,179 ft above sea level at the upper robbing limit, 990 ft at the floor of the rock gangway of the active level and

EACH CHUTE is driven up the pitch by two miners to a length of 120 ft, except that every fifth chute is driven through to tap into the upper robbed area for ventilation and drainage. Three-piece timber sets are installed on 5-ft centers.

More rapid development and faster extraction

940 ft at the low point of the Holmes-vein basin. Pitch of the south dip is 45 deg.

The main development opening is a gangway in the bottom rock at a distance from the vein that permits 25-ft-long rockholes to be driven on a pitch of about 35 deg to the bottom of the vein. The rockholes are from 8 to 10 ft wide and 6 ft high and are driven from the gangway to the coal on 50-ft centers.

As shown in the diagram, a 6 x 6-ft airway is driven through the bottom of the vein halfway each direction from each rockhole. Chutes are turned straight up the pitch along the bottom rock from each rockhole and are driven to a distance of 120 ft. However, every fifth chute is driven all the way up to hole into the old workings of the upper level for ventilation and drainage.

Breast headings are driven across the pitch from the chutes on 60-ft centers in the same manner as the airway; that is, halfway each direction from each chute. Each chute and rockhole is divided into a manway and coal runway as in conventional breast-and-pillar mining. Four miners, two on each shift, work each of the chutes.

This development leaves about 100 ft of solid coal along the top of the lift, penetrated only at 250-ft intervals by the chute extensions through the bottom coal to the old workings. As soon as the first two or three chutes with their attendant airway and breast headings are completed, the longhole operations begin. Thus, final recovery closely follows initial development to eliminate some of the roof-control problems that appear when places are kept open too long.

First, the coal above No. 2 breast heading is recovered, then the lower pillars defined by the chutes on 50-ft centers and the breast headings and airway on 60-ft centers. According to the plan, the solid coal in the upper portion of the lift will be extracted throughout the entire length of the section (550 ft) before the lower pillars are taken.

LONGHOLE EQUIPMENT

The drill is an air-operated Jeffrey A-6 post-mounted machine, rated at 4½ hp and having a feed rating of 3 fpm. The Kennametal auger sections are 1¾ in in diameter and 2 ft long; bits are 2-in Kennametal K12's. The unit is manned by two drillers, who, after a brief period of training, now drill about 200 ft per shift including setups. In the beginning, drilling was done on two shifts but now it is a single-shift operation.

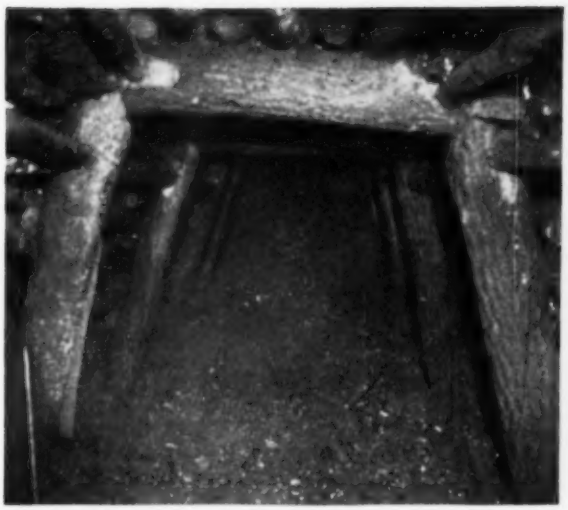
Recovery of the coal in 8-ft-wide slabs in the solid upper portion of the section was begun inby No. 13 chute. The drill is set up in No. 2 breast heading to drill a fan-shaped set of holes across the thickness of the vein. The number of holes to be drilled is a matter of judgment among Mine Foreman Edward Stein and the drillers. In some instances, as many as 10 holes have been used, and in others, as few as five. In the 10-hole shot, some of the holes were relatively short openers. The holes are drilled to within 30 ft of the upper level to leave a 30-ft-thick chain pillar along the top of the lift. Subsequent roof pressure breaks out most of this pillar, however, thus increasing total recovery.

The long holes are charged with Independent A 40% permissible in 1¾x16-in sticks. Average consumption is from 50 to 70 lb per hole. The first stick placed in the hole is laced with plastic-reinforced Primacord which extends throughout the length of the hole to insure complete detonation. Instantaneous electric caps detonate the holes that break against the relief provided by the chute extension in opening up the section, while following holes are primed with delay detonators.

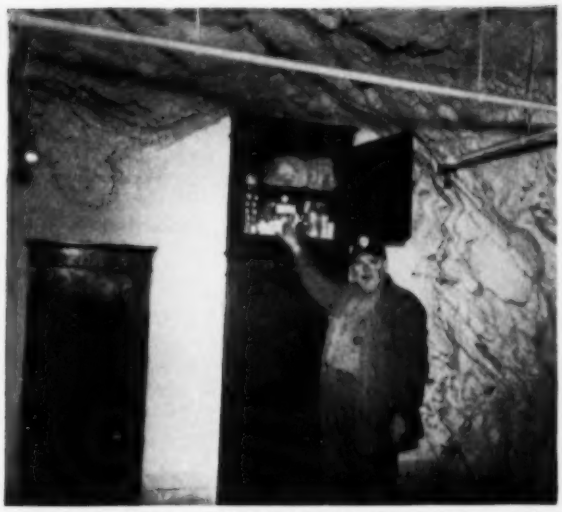
The charge is pushed into the hole by a jointed tamping rod; confinement for the charge consists of incombustible stemming in tamping bags, and rounds are detonated by a Hercules 10-cap blasting machine. The drillers charge and detonate the holes and then the miners who worked the coal openings take over to load the coal into the 4-ton mine cars.

BETTER FOR BAD-ROOF AREAS

The roof is not particularly good. In other methods of mining, it has been a source of considerable trouble. Furthermore, when places were open and active for a longer period, a high degree of dilution was the rule and roof rock appeared soon after loading began. On the other hand, longhole mining began at chute No. 13 in December, 1952, and at the time of the mine visit in mid-January, 1953, 484 cars had been loaded at this chute



AIRWAY is driven in coal along the tops of the rockholes. Lowest chain pillar will be drilled and shot from the airway.



MINE FOREMAN EDWARD STEIN shows some of the facilities of the underground first-aid room.

reduce high costs of maintaining openings

without the normally expected amount of rock showing up at the battery.

In the coal openings, 3-piece timber sets are installed on 5-ft centers with lagging, forepoling or shingling as required. The separator between manway and coal runway is a plank curtain.

Although the work still is new and under close study, Mr. Peca says, early returns indicate a 30% reduction in face labor costs might possibly be achieved. Also in the credit column is the reduced physical drain on the men since they no longer carry heavy supplies to the upper portion of the lift. And since the lower half of pitch workings can be driven in much less than half the time required for the upper half, the places come into maximum production much earlier than they would under older methods.

Flexibility also is a feature of the system. With chute extensions to the upper workings only 250 ft apart, two faces may be worked in a concentrated area. Such advantages point to a total recovery that may go as high as 90% or more, judging from production at chute No. 13.

The second sublift, the pillars between the breast headings, will be drilled from No. 1 breast heading. The final sublift, the pillars between the airway and No. 1 breast heading, will be drilled from the airway.

Concerning roof control, Mr. Peca contends that the shot coal fills all available space and contributes some measure of support. As the coal is withdrawn the roof breaks and falls but it must follow the coal down the pitch. Therefore, when rock finally does appear at the battery in quantity, it will be time to stop loading at that chute and move on.

NORTH DIP RECOVERY PLANS

As previously mentioned, the bottom of the Holmes-vein basin is only 50 ft below the floor of the existing rock gangway. If the existing rock chutes are extended on their present lines, they will penetrate 60 ft of solid coal from the bottom rock of the south dip to the bottom rock of the north dip, which pitches at 70 deg.

At present, Alpec management plans to drive every other rockhole to the bottom rock of the north dip and to drive slant chutes up the pitch on these 100-ft centers. Starting at the tops of these slant chutes, long holes will be drilled straight up the pitch to cut slabs from the pillars between the chutes. The present rock openings therefore will serve in the recovery of both the south and north dips.

Thinking further ahead to the recovery of the coal that will be left in the extreme bottom of the basin, Alpec officials will investigate the possibility of driving horizontal rock openings from the bottom of the gangway to bring out the solid coal in the heel of the basin through the use of conveyors. The goal is to mechanize as much as possible the recovery of the section.

THE MEN AND THE MINE

Albert Peca's chief lieutenant in managing the operations of the Peca enterprises is Alfred Peca, general superintendent. The operations include Park No. 1 mine and Springdale stripping at Mahanoy City, and Morea colliery, Morea, Pa. Ernest Peca is general manager at Morea. Park No. 1, where the longhole mining is done, employs 122 men inside and 30 outside. The main opening is a 22-deg slope in the Bottom Split (Mammoth) vein. It is 1,100 ft long and was driven from the inside to the surface.

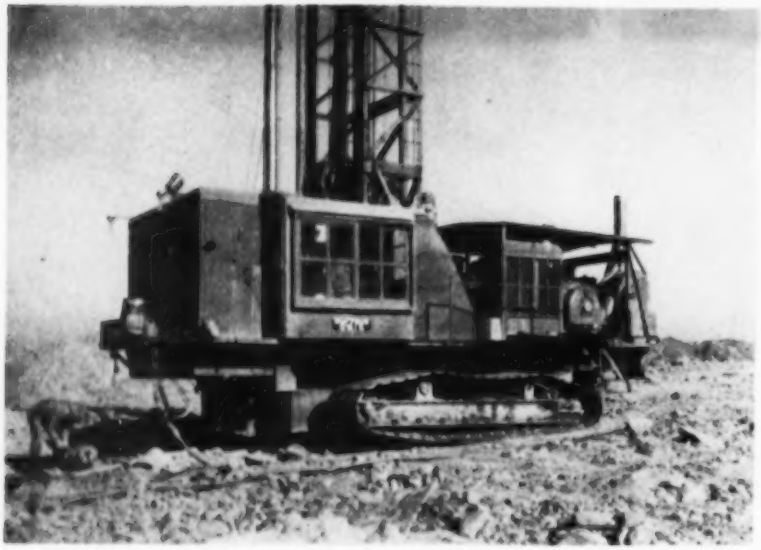
The combined operations produce about 3,300 tons daily, with about 750 tons coming from Park No. 1.

Which Russian Do You Listen to?

"Poor technical management led to a production deficiency of 37,000 tons at the Varpalota coal mine in December. Frequent equipment breakdowns and shortage of spare parts are the cause. During November there were 11 cases of rubber belts breaking and six cases of electric motors burning out."

"Coal production in the Soviet Union exceeded planned goals in 1952, with the Ministry of the Coal Industry reporting over-fulfillment of quotas for both energy-producing and coking coal. Under the current Five-Year Plan (1951-1955), the Soviet Union is trying to increase coal output 43%."

—From Soviet radio and press reports monitored for Coal Age.



REPLACING three vertical drills and one horizontal unit, the new rotary drill has drilled 2,000 ft of 10⅝-in hole in two 7¼-hr shifts. Level'ng is by three hydraulic jacks. Average drilling rate is 105.8 ft per hour.

Faster Overburden Drilling

New Dry-Type Rotary Drill Slashes Drilling Manpower 79% . . . Speeds Bank Preparation . . . and Cuts Explosives At Maumee's Sullivan No. 27 Mine

By A. E. FLOWERS
Assistant Editor, Coal Age

REPLACING three vertical drills and one sidewall unit, a new rotary overburden drill of the dry type now in operation at the Sullivan No. 27 mine of the Maumee Collieries Co., Linton, Ind., also is providing these added advantages:

1. A 79% reduction in drilling manpower.

2. Ability to drill 2,000 ft of 10⅝-in hole in two 7¼-hr shifts.

3. Capacity to permit drilling and shooting over 61,000 cu yd of overburden in two shifts.

4. A significant reduction in the quantity of explosive required per cu yd of material blasted.

5. Capacity making it possible for a new dragline to move 1,023,000 cu yd of overburden in 26 24-hr working days in December, 1952.

Development of the new drill—Bucyrus-Erie 50-R—is a product of the constant search by Maumee officials for new, more efficient equipment and the desire of manufacturers to fulfill the industry's needs. David W. Aten, vice president, and Robert Akre, superintendent of drilling and blasting, cooperated with Bucyrus engineers in the development of the new drill. Drilling at Maumee progressed from 6- and 8-in holes to 10-in holes in about 8 yr. Until the present rotary drill went into service, Maumee officials felt that "pounding" a 10-in hole in rock was a poor method of drilling. Yet they felt it was the cheapest way to obtain the best ratio of cubic yard of material per drill hole. The remarkable record of the new drill has shown what can be achieved when producer and manufacturer combine to improve equipment.

Located 1 mi southwest of Dugger, Sullivan County, Ind., the present Sullivan No. 27 strip pit was opened in August, 1947. Preliminary work was done by two Bucyrus-Erie 42-T drills working ahead of a Marion 5480 shovel equipped with an 18-cu yd bucket. A 15W dragline equipped with a 215-ft boom and 15-cu yd bucket was later added for stripping. These two stripping units worked in tandem until July, 1950 (*Coal Age*, September, 1951, p 84), when they were separated and each was assigned to a separate pit.

In April, 1952, a new Bucyrus-Erie 1250-B walking dragline, the third of its type built, was put in service in the present pit. Overburden removal immediately increased and soon the dragline was handicapped because overburden drilling and blasting could not keep up with the new unit. When the new 50-R rotary drill arrived, the 1250-B did not have room to swing normally as a result of the unequal capacities of stripping and drilling equipment. The new drill keeps well ahead of the stripping unit, permitting maximum work from the dragline.

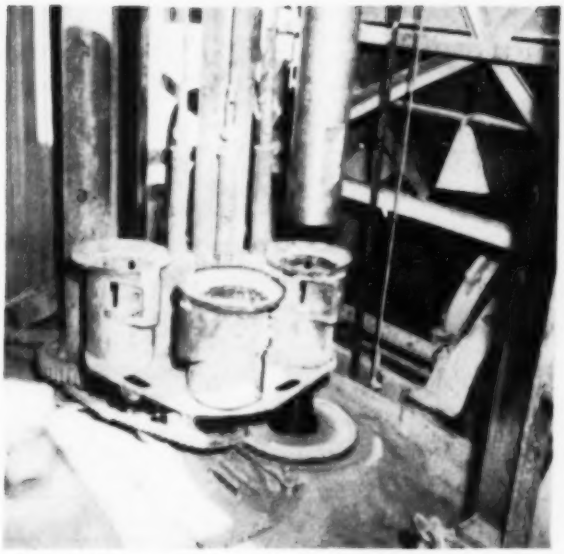
The new drill consists of a fabricated steel frame, operator's cab, three hydraulic leveling jacks, a one-piece derrick, an m-g set with Ward Leonard control, operating machinery, rotary drive mechanism, hydraulic pull-down and two air compressors. Total weight of the unit is approximately 45 tons.

Overall dimensions are:

Length, derrick raised	30 ft 7 in
Length, derrick lowered	52 ft 0 in
Width	14 ft 6 in
Height, derrick raised	54 ft 0 in
Height, derrick lowered	15 ft 0 in

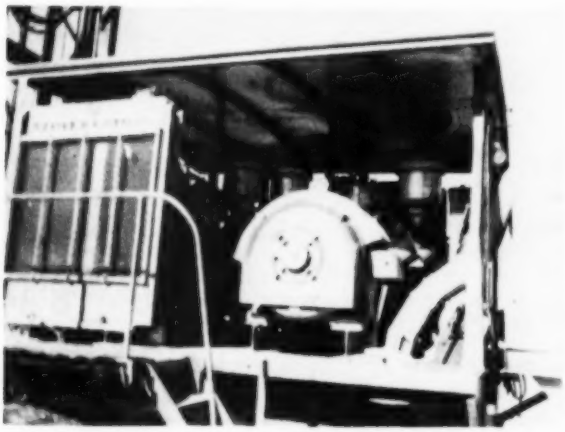
MACHINE UNITS

The m-g set is equipped with Ward Leonard control. A 4,000-v, 3-phase, 60-cycle 100-hp motor drives two generators to operate the hoist motor and rotary drive motor. A 440-v, 3-phase, 60-cycle 5-hp motor with generator serves as the exciter unit.



POWER-DRIVEN built-in piperack permits speedy handling of 33-ft drill rods. Bull wheel is shown in background.

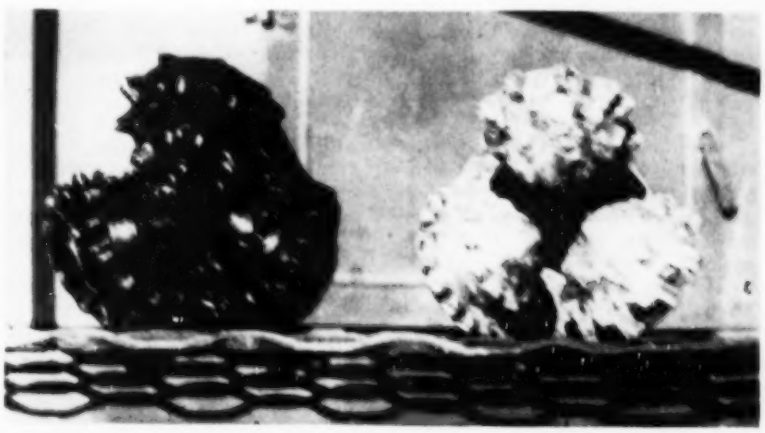
REMOVING or adding a drill rod is accomplished in less than a minute. No physical labor is involved.



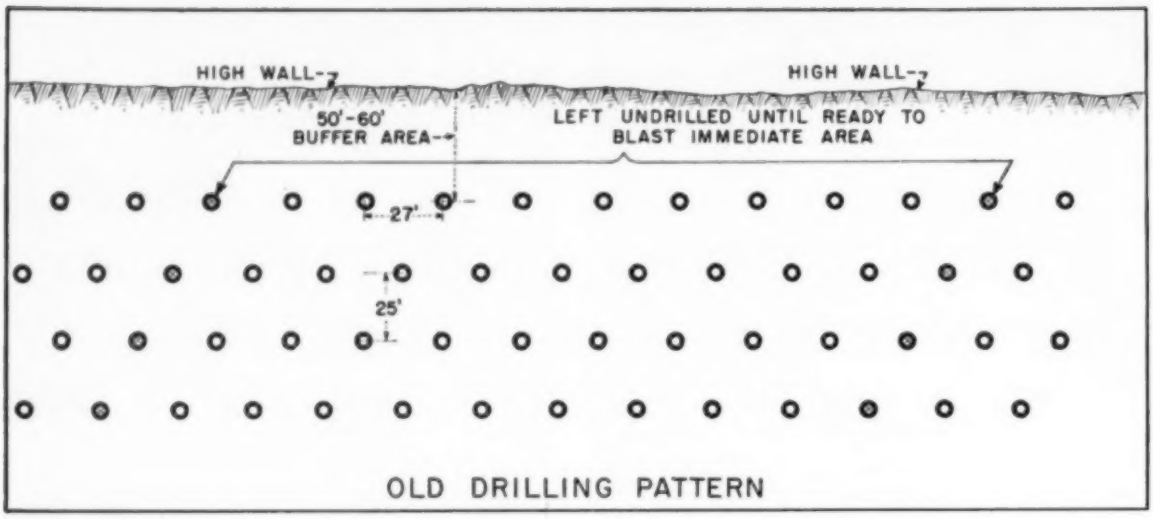
HOLE CLEANING is accomplished by two 686-cfm air compressors. Cuttings make good stemming material.

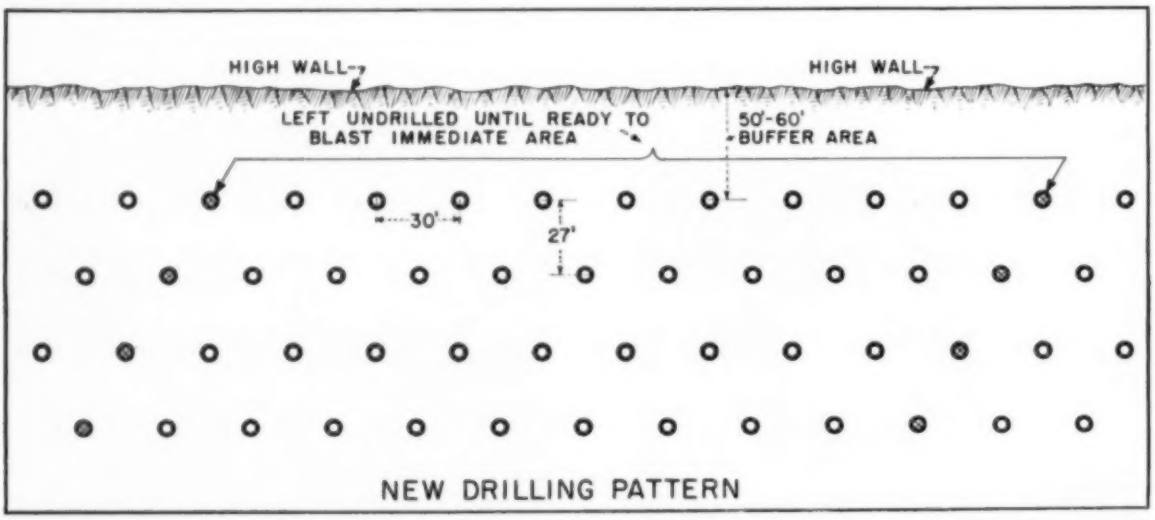
TWO MEN load, stem with cuttings and connect drill holes. Tractor keeps buggy of explosives at drill.

OPERATION is by one man in a cab with convenient controls.



DRILL BITS are of the rotating-cone oil-well type. On the left is a new one, ready to be installed. Right unit has drilled almost 5,000 ft of hole.





SPACING has been increased 11% between rows perpendicular to the highwall and 8% between rows parallel. Volume of material shot per hole has been increased 20%. Explosives requirements also have been reduced.

Power transformation is by three 5-kva units with 2300/4000-Y primary and 460-v secondary for the exciter motor and hydraulic-pump drive. A second 5-kva transformer with 4000-v primary and 115-v secondary furnishes power for the light plant.

A 25-hp hoist motor drives the bull wheel for hoisting tools, propels the unit, and powers the derrick hoist and utility reel. Power for the rotary drive is furnished by a second 25-hp motor.

Two Gardner-Denver Model WBJ air compressors, 686-cfm rating, provide air for removal of drill cuttings. Each is driven by a 4000-v, 3-phase, 60-cycle 125-hp motor.

The hydraulic pressure unit is made up of two oil pumps, each driven by a 440-v, 3-phase, 60-cycle 5-hp motor. Operation of the hydraulic pull-down fluid motor, the drill-pipe-rack fluid motor and hydraulic leveling jacks is by these units.

The rotary drive is a motor-driven gear reduction unit with Ward Leonard control. It is slideably-mounted in the derrick and attaches to the top of the drill pipe.

Vertical traverse of the rotary drive unit is provided by a rope drive from the bull wheel rotating the shipper shaft, which has rack pinions engaged with gear racks in the derrick.

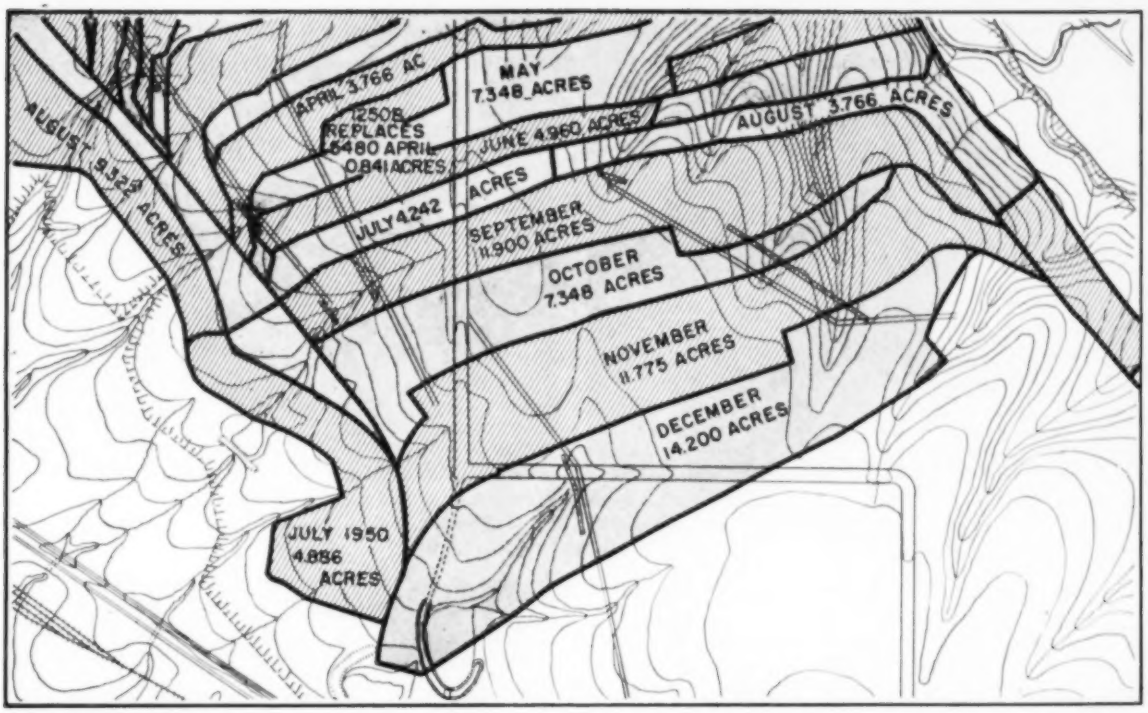
The bull wheel is a gear-driven drum with a band brake. For hoisting drill tools, the drive is engaged with the Ward Leonard-controlled hoist motor. Tools may be lowered on brake or on motor. For pull down and tool feed, the drive is engaged with the fluid motor.

Pull down is accomplished by a gear reduction unit driven by a fluid motor driving the bull wheel and providing controlled load on the drilling tools.

Raising and lowering of the derrick is by a hoist motor through gear reduction. Working height of the derrick above the platform is 40 ft 3 in. The utility reel is driven similar to the derrick hoist.

Mounting of the unit is on crawlers, chain driven from the main machinery. Each tread is independently controlled by an air-operated friction clutch and band brake. Bearing area is 82.5 sq ft. Overall length of the 36-in treads is 15 ft 2 in.

Three hydraulic jacks, 7-in in diameter with a 42-in stroke and capable of a 22-in lift, are used to raise and level the unit before drilling. Spud shoes are 36-in in diameter.



INCREASED output of dragline resulting from better overburden preparation since the new drill went into operation in September is clearly indicated on the monthly progress map. Further improvement is expected in the future.

Dust collecting is accomplished by a No. 8 Roto-Clone powered by a 5-hp 440-v AC motor.

DRILLING AND SHOOTING

A new drilling pattern has been developed since the new unit began operating Sept. 16, 1952. Hole spacing has been changed from rows 25 and 27 ft apart to rows 27 and 30 ft, and explosive per hole has been reduced approximately 7 to 8%. Holes, 10⅝-in in diameter, are drilled on a diamond pattern with rows parallel to the high wall on 27-ft centers and rows perpendicular on 30-ft centers.

Approximately 50 to 60 ft of shot overburden is left as a buffer between the highwall and the first rows of holes. Holes are loaded with 8½ x 22-in Hercules powder and connected with Primacord. DuPont 60-millisecond delay connectors are used on each hole. Present practice is to shoot 30 to 40 holes in a group. To prevent propagation of the blasting to other holes, an undrilled area is left between groups of holes and is drilled when the area is ready to be shot.

Three-man drill crews handle all the drilling and shooting on each shift. One man operates the drill while the other two load, stem and connect drill holes with Primacord. Five rubber-tire-mounted insulated buggies are used to transport explosives from a large supply truck to the drilling site.

An Allis-Chalmers rubber-tired farm-type tractor pulls the buggies, each containing 4,800 lb of explosive, to the stripping area. There an Allis-Chalmers HD5 tractor takes over and pulls the buggies to the drilling area. One buggy is always kept close to the drill so that the drill crew can load holes without delay. The five buggies are loaded on the day shift and store enough explosives to supply both shifts.

DRILL ADVANTAGES

Drill-hole cuttings, cleaned from the hole by air, furnish excellent stemming for blast holes. Blown-out shots and non-uniform breakage have been eliminated. Management credits the greatly improved shooting results to the following:

1. Holes are cleaner and drier.
2. Excellent stemming is furnished by the cuttings.
3. Cracks in strata near previously blasted highwalls are filled by air-blown cuttings as holes are drilled.
4. The drill hole is smoother and more uniform.

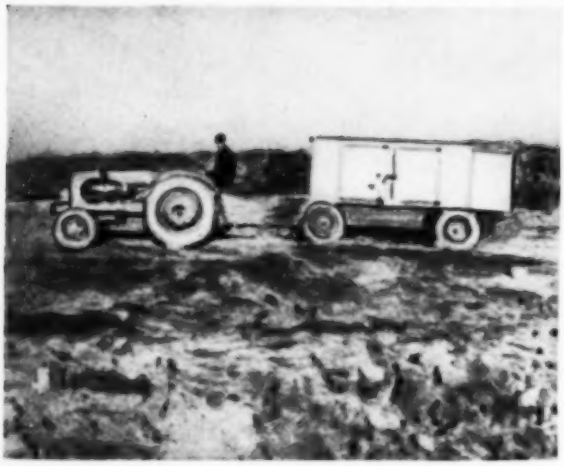
An increase of approximately 16% in cubic yards of material per pound of explosive has been achieved since the new drill went into operation. Reduction in quantity of explosive began in September, shortly after the drill went into operation, and continued through October. Since that time quantity of explosive per hole has been relatively standard for any one type of overburden.

Statistics alone do not tell the story of what the new drill has accomplished at Sullivan No. 27 mine. Surface material is exceptionally thin and the remainder of the overburden is exceptionally hard and abrasive, consisting entirely of hard sandy shales and massive sandstones. Consequently, bits must work harder and drilling speed is slower than in softer materials. In addition, better overburden preparation is necessary for dragline work than for shovel operation, and this means more explosive per hole to get the proper fragmentation. Management is confident that further reduction in explosives will be possible in the future until optimum conditions for dragline operation have been reached.

First holes drilled with the new unit were 9⅞ in in diameter. Now, 10⅝-in holes are drilled with a Hughes Tri Cone Type OSC1 bit. Bits drill 4,000 to 5,000 ft of hole before being replaced. Bit cost per foot of hole is $0.0336 and power cost is $0.019 per foot.

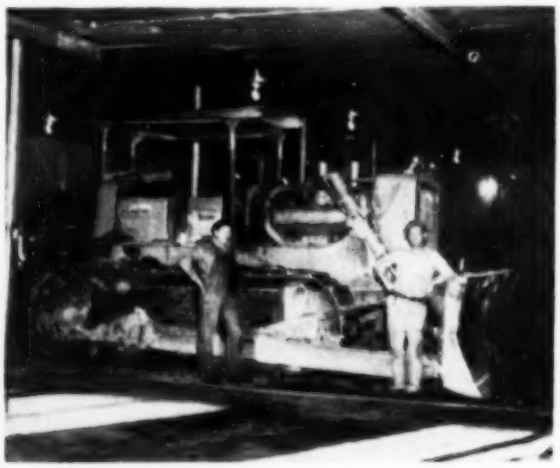
Better footage and longer bit life have been experienced with the larger bit in addition to a reduction in drill-

NEW dragline, on shot bank, removes 40 to 60 ft of overburden from irregular coal. Normal pit width is 100 ft.



RUBBER-MOUNTED tractor pulls explosive buggies after they are loaded and delivers them to drilling site.

LARGE 32-ton diesel-powered dropbottom trucks carry coal from the pit to the loading hopper along the railroad. Electric-powered 3¾-yd shovel loads truck.



GOOD HOUSEKEEPING is the watchword of Elbert Hunter, mechanic helper (left), and Lawrence Stephens, head mechanic at No. 27 mine. Tractor awaits overhaul.

KEY MEN at Sullivan No. 27 are Harvey Grounds, mine supt. (left), and Robert Akre, supt., drilling and blasting.

CHIEF ENGINEER, Lafe Stewart, plans future mining operations. Maumee tackles problems through engineering.

Table I—Summary of 50-R Drill Performance for December

Size of hole		10⅝ in
Total holes drilled		804
Total feet drilled		35,481
Total cubic yards drilled		979,680
Total hours worked		360.25
Avg. drilled per bit, ft		4,435.1
Avg. drilled per hour, less lunch period, ft		105.8
Avg. drilled per shift, ft.		714.0
Avg. depth of hole, ft		44.1
Delay for blasting	19.00 hr	
Delay for repairs	29.91 hr	
Delay for electrical trouble	11.00 hr	
Delay for compressor repair	2.25 hr	
Grand total, lost time, hr		62.16
Delay, % of hours worked		18.6
Avg. drilling rate per hour with lost time deducted, ft		129.9

ing cost per cu yd of overburden. Management believes that the larger hole is kept cleaner and therefore bits are subject to less abrasive action and cut more rapidly.

With the old equipment, 35 men were employed in drilling and shooting. Now 8 men, working two 7¼-hr shifts, handle all drilling and shooting.

Flexibility in feed permits the drill to work at maximum efficiency in all types of material. A typical hole would be drilled as follows: The rotary drill motor is engaged and the electric DC motor on the drum is put in reverse to prevent the tools from feeding too rapidly. Drilling proceeds in this manner until 8 or 10 ft is drilled or the drill slows down. Next, the drill is put in neutral and the weight of the carriage and tools (about 8,000 lb) feeds the drill 4 to 5 ft. At this point, a small amount of electric feed is applied until the bit hits hard rock. After the electric motor is put in neutral, hydraulic drive takes over and continues for the balance of the hole. Present pressure is 36,000 lb, with the machine capable of pressure as high as 50,000 lb.

Drill rods, 33-ft long, are made of 7-in drill tubing. They have tapered threads and are stored on the built-in piperack which is power-driven for easy placement of rods.

Ample reserve power and drilling capacity have been incorporated in the unit if future plans require a larger and deeper hole. One 99-ft test hole has been drilled with as much ease as a 30- or 40-ft hole.

Length of drill rod stabilizer has been found to be of considerable importance in getting maximum footage per shift. A combined length of 5 ft has been found to be the best length for stabilizer and bit at Maumee.

Other benefits credited to the new drill are:

1. Relief of water problem in pit.
2. Better roads on the coal because holes stop at the coal and shots do not pit the area.
3. Easier digging for the 1250-B because of better fragmentation.

MINING THE COAL

Mining operations at Sullivan No. 27 mine consist of drilling with the new 50-R drill, removing overburden with the new 1250-B dragline, loading coal with a Marion 490 electric shovel and hauling coal with 32-ton Euclid dropbottom trucks.

The Indiana No. 7 seam, stripped at No. 27, averages 38 in in thickness and is very irregular in dip. When viewed in the pit, the top of the coal has an irregular wavy appearance. Overburden removal is difficult in this rolly condition and requires a skilled drag operator.

Drilling and shooting is kept well ahead of the dragline, which works on the shot bank. As the dragline uncovers coal it also builds a rock roadbed to walk on and for the other strip equipment. An Allis-Chalmers HD20 aids the dragline in making the bench. This pays off in that equipment works on relatively hard material instead of bogging down in the mud. Average width of coal uncovered is 100 ft, although in some cases the pit has been considerably wider.

A Marion 490 electric shovel, equipped with a 3¾-yd bucket, loads coal in 32-ton dropbottom Euclid trucks which transport it to a loading hopper. The hopper feeds to a drag conveyor which delivers to railroad cars for transportation to the Sponsler preparation plant located south of Linton, Ind., on the PRR and CMSt.P&P railroads.

ROAD CONSTRUCTION

Good haulage roads are another outstanding feature of Sullivan No. 27. Road construction is a four-step operation:

1. A road base 2 to 3 ft thick is made from rock out of the strip pit.
2. Crushed No. 2 limestone is spread over the base. This material is packed down by the heavy trucks.

Table II—Summary of 1250-B Dragline Performance for December

Down time, hr	131.75
Work time, hr	492.25
Swings	40,651
Avg. swings per hour	82.80
Material stripped, yd	1,023,000
Avg. yards per swing	23.95
Yards moved per hour	2,078
Tons produced after cleaning	52,922

Working Ranges 1250-B Dragline

Length of boom		200 ft
Max. allowable load, lb		153,000
Capacity of bucket, cu yd		30
Angle of boom	30 deg	35 deg
Dumping height	76 ft	90 ft
Dumping reach	191 ft	184 ft
Digging reach, under boom point	194 ft	187 ft
Digging depth, under boom point	120 ft	110 ft
Depth bucket can be lowered, std. ropes	133 ft	123 ft

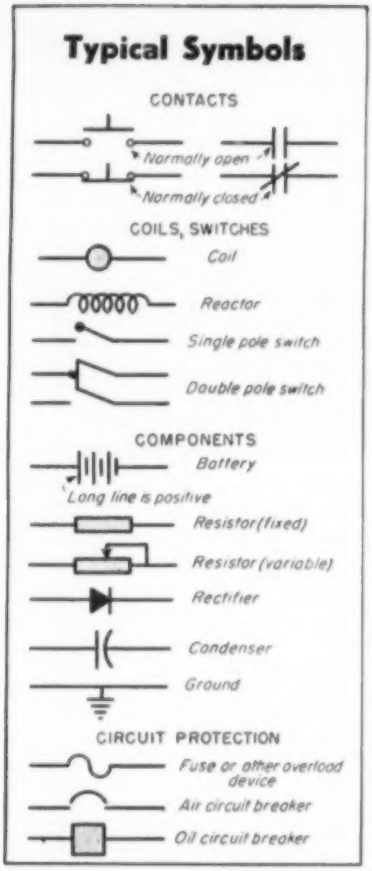
3. Crushed No. 7 limestone is spread over the previously laid No. 2 material and is packed down by the truck traffic.
4. After the road is well compacted, No. 9 limestone is added.

Overburden removal is carried out on a 3-shift, 5-day basis by the new 1250-B dragline. Going into operation in April, 1952, the new unit soon demonstrated its ability to move overburden quicker than it could be drilled and shot. By the time the new 50-R drill went into operation it was seriously handicapped for working room. At present, dragline and drill are making possible a smooth high-producing operation.

Coal loading is done only on the day shift, 6 days per week. Approximately 2,400 tons of clean coal is produced on each loading shift.

A highly efficient, well organized organization makes possible loading 63.2 tons per man on the payroll. In addition to running a well coordinated operation, local management keeps accurate daily records of all phases of the strip operation.

Hugh B. Lee is president in charge of all Maumee operations. David W. Aten is vice president. Lafe Stewart is mining engineer and Robert Akre is superintendent of drilling and blasting. Harvey Grounds is superintendent of Sullivan No. 27 mine.



Electrical Diagrams

What they mean . . . How to use them

Are you confused every time an electrical diagram is spread before you? Do you become the silent partner when men who understand electrical symbols and prints discuss an electrical problem? Even though you are an electrical man by trade you can profit from this explanation of the electrical mystery.

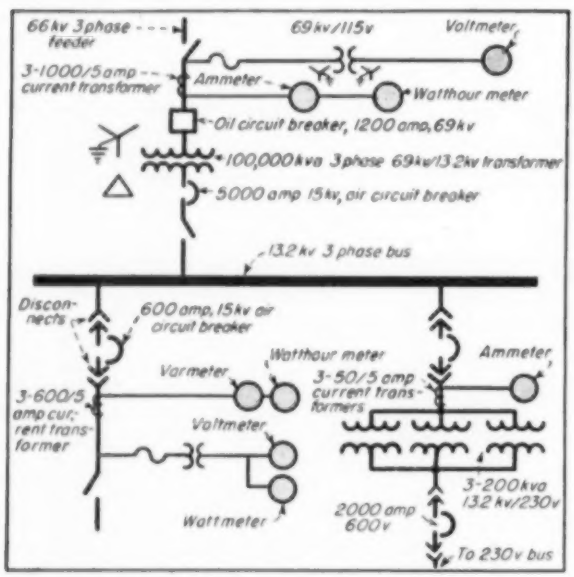
ACTUALLY, an electrical diagram is really only a time-saving combination of lines and symbols assembled to give a graphic description of an electrical circuit. Another way to describe electrical drawings is to call them electrical shorthand—for that is what they are. Can you imagine how much dictation a secretary could take in longhand? We all realize how important shorthand is to secretaries. Similarly, the electrical designer and electrician use symbols to save time and to simplify their work. The group of symbols on the left are typical of those used in electrical diagrams.

Electrical men learned that if everything about an electrical circuit was put in one diagram it would be confusing. Three classes of electrical diagrams resulted from their efforts to simplify charts: one-line, elementary and connection. Each serves a definite purpose for designer and electrician.

The one-line diagram shows only the major features or parts of an electrical setup. The elementary diagram shows sequence of operation of relays, switches, etc., and is very useful in trouble shooting. Connection diagrams show the correct relative location of each element.

Adapted from a recent article in *Power*, another McGraw-Hill magazine.

ONE-LINE DRAWING . . . shows at glance the layout of major equipment



PLANT DISTRIBUTION electrical setup is shown as a one-line diagram. Emphasis is on the over-all picture.

SIMPLICITY is the goal in preparing the one-line diagram. All major components are shown, with one line representing feeder connections regardless of the number of conductors in the feeder. This type chart is a simplified electrical-flow diagram. With it you can analyze the electrical distribution system at a glance.

The illustration shows how major pieces of equipment are lined up, identified, then connected with a single line representing a feeder. You can apply this method to any piece of mining machinery as well as to the entire system. The sketch illustrates the layout for a distribution system. Similar rules apply to any mining machine or preparation plant. In making the one-line drawing, line up the components as single rectangles in the order they fit into the system. Don't try to show circuit details.

This type of print has a two-fold purpose. First is to act as a guide for those not well acquainted with the mine machine or the power system.

Second, it acts as a handy reference when electrical trouble crops up. With it you can quickly isolate the trouble area and pave the way for using the elementary diagram.

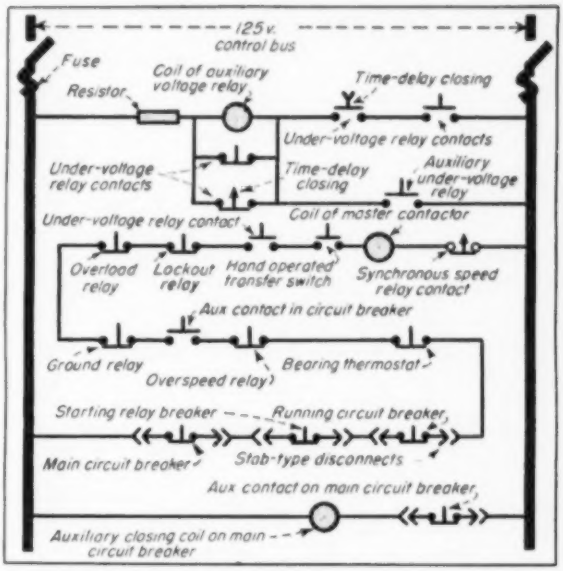
Remember that the one-line diagram must be kept simple. Don't try to have one diagram do more than one job. Let each serve its individual purpose.

ELEMENTARY DIAGRAM . . . outlines the machine operating sequence

THIS DIAGRAM gives you more help than any other in maintenance and trouble shooting. The aim in preparing an elementary chart is to lay out the sequence schematically regardless of actual equipment location. Sequence of machine operation rather than placement or location is the key in constructing such a diagram. For example, if the coil of a particular relay comes into the sequence ahead of some of its contacts, the coil and contacts are divorced and shown at different levels, depending on their true electrical sequence of operation.

If elementary diagrams are not available for all machines, it would be a worthwhile future project for the chief electrician. First step in preparing it is to become familiar with machine components and the precise operating sequence. Personal observation and manufacturer's diagrams will help you master the sequence. Once the knowledge is mastered it can be translated into a diagram similar to the one illustrated.

Note the heavy lines on both sides of the chart. These represent the control feed and are common to all components of the illustrated control circuit. The chief electrician's approach to the problem of establishing an elementary diagram is to establish similar control feeds, then run needed circuits between. You may find it more convenient to adopt the standard system where each device is identified by number rather than by name. Some of the more widely used symbols are included in the illustration. A complete list of symbols may be obtained from Basic Graphical symbols for Electrical Apparatus Z32.12, AIEE, 33 W. 39th St., New York.



SYNCHRONOUS CONVERTER control circuit in part. Note how easy it is to shoot trouble compared to diagram below.

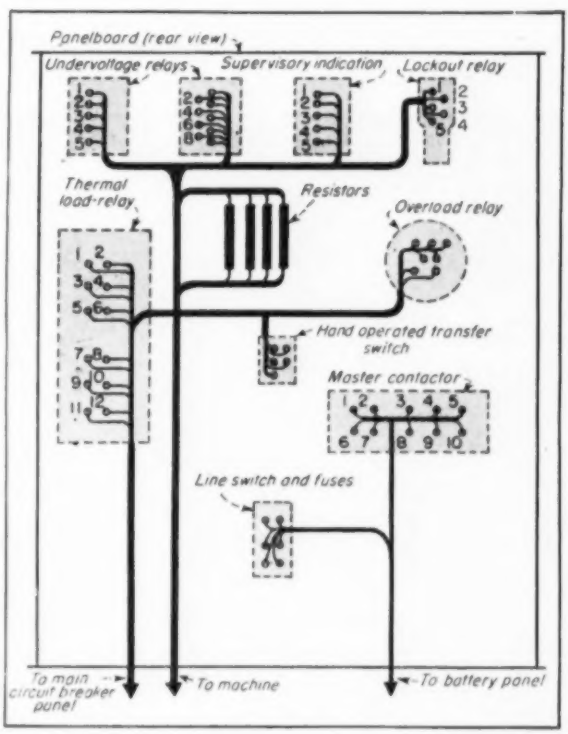
CONNECTION PRINT . . . stresses physical location of components

A WIRING or connection print shows the physical setup of devices. The pictorial rather than the schematic side is stressed. This chart will not give the trouble shooter enough information. It comes into its own after trouble is localized with the help of the elementary diagram. A connection diagram often includes enough data to link a contact or coil in a relay with its terminals on the relay case.

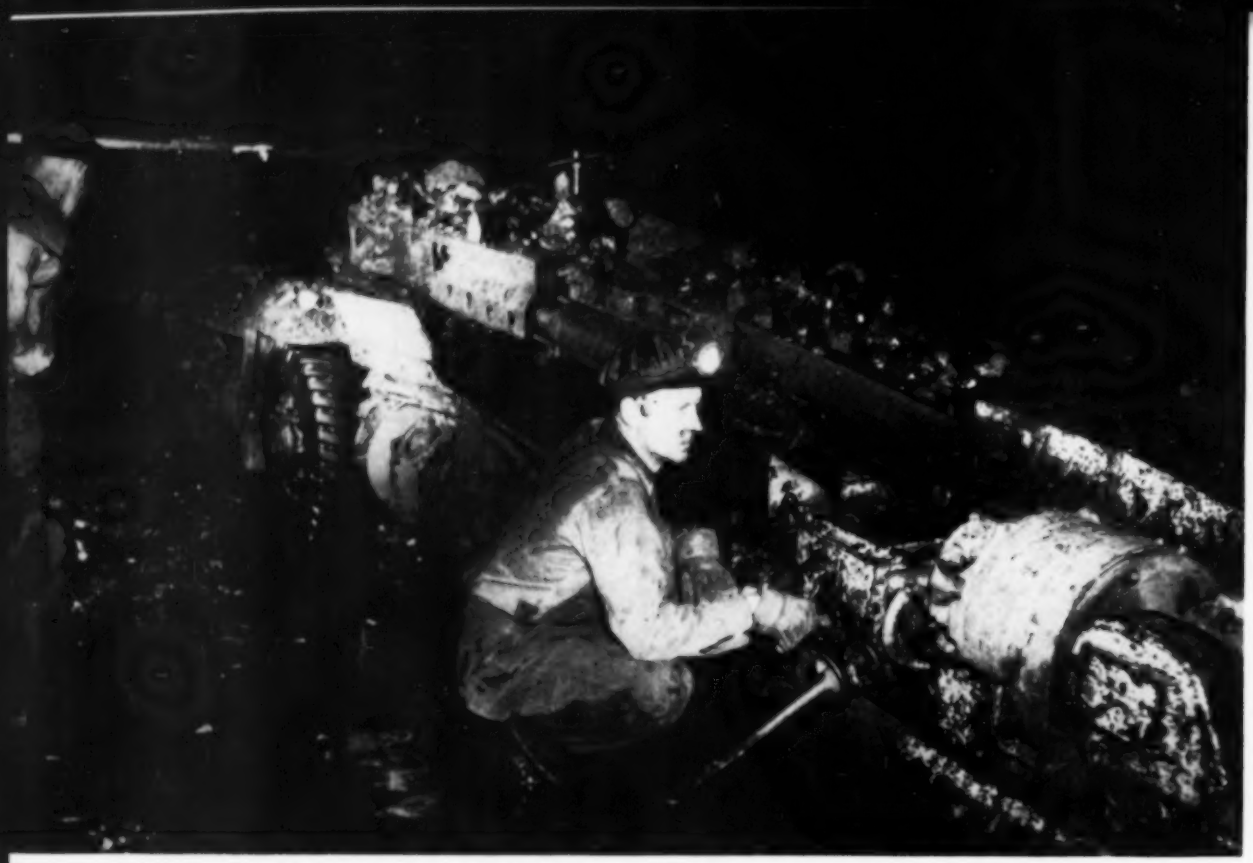
A complete connection diagram for a switchboard section includes all the information shown in this diagram. In addition it may have numbers for each wire and the numbered conduits they enter after leaving the switchboard. This wire-numbering system is mighty handy to have around when you "ring out" a circuit. With it you can take a specific wire off a relay or other part and be confident that it goes through a definite conduit and ends at a specific terminal at the other end.

Don't waste time trying to trace a circuit with a connection diagram—it's not designed for that. Use it during the original installation as the wiring bible and later in tracing circuits after isolating trouble wth the elementary diagram.

Chief electricians will find little use for connection charts once they know their equipment. One-line and elementary prints become their troubleshooting handbook in locating bad contacts, burned-out coils and resistors. Top-notch electrical men agree that most troubles in automatic equipment come from faulty makeup between relay contacts. Usually the relay is not at fault, but rather improper adjustment by a careless repairman is causing the trouble. If in doubt about relay contacts, replace them to avoid outages. Don't be satisfied with makeshift or temporary repairs.



SECTION OF PANEL for same converter. Connection diagram eases tracing circuit after trouble is localized.



EQUIPMENT BEHIND SOLON NO. 3 PRODUCTIVITY JUMP includes new 4½-ton shuttle cars with four-wheel drive and steer. Replacing 3½-ton units with two-wheel drive, these cars contributed heavily to new productivity records.

Capacity Equipment Skillfully Used =

MEN BEHIND SOLON NO. 3 PROGRESS include this crew for the right side of the mine that loaded 1,055 tons in one shift without special preparation. Front row, Stanton Lewis (left), Bill France, H. W. Randolph (foreman), Ell Randolph and Bud Overstreet; second row, Roy Pirtle, Woodrow Hargis, J. E. Riddle, R. K. Randolph, Willard Roberts, John Gardner, and Edsel Overstreet; rear row, Bill Kilgore, Robert Randolph, Ray Riddle, Buddy Beaty and General Reeves (Albert Nash and Thurston Phillips not present).

HAULAGE CONTRIBUTOR are new 4½ ton dropbottom cars at shop and supply house; tipple at the right.

SUPPORT CONTRIBUTOR is roof-bolting to hold drawslate in approximately 75% of the places.

24.7 Tons per Man

A JUMP OF MORE THAN ONE-THIRD in tons per man follows Tennessee Coal Co. changes in equipment and methods. Seventy men have averaged 1,755 tons for 18 days and one crew loaded 1,055 tons in one shift.

By J. H. EDWARDS
Associate Editor, Coal Age

A LOADING RECORD for one machine of 1,055 tons in one 8-hr shift, without special preparation and with no drive to achieve a new high for the mine, is one example of the gains chalked up by new equipment and methods changes at Solon No. 3 mine of the Tennessee Coal Co., Monterey, Tenn. Operating in coal 66 in thick, and with less than favorable conditions in many respects, the mine also marked up these additional records in September, 1952:

An output of 2,012 tons in one shift by three loading machines operated by 2½ crews.

An average mine output, one shift per day, of 1,755 tons for eighteen consecutive working days, again with three machines and 2½ crews.

Total tons per man on the payroll was 24.7, compared to 17 before the improvements.

The seam at Solon No. 3 lies practically level. The roof is fairly good and the coal has no continuous partings. Drilling, however, is too hard for rotary augers. Considerable water enters the mine, and the bottom is so soft that 75% of the shuttle-car roadways must be planked. Much of the roof must be bolted in the production cycle. Cover over the seam ranges from 50 to 150 ft, and is 100 ft at the haulage slope.

FOUNDATIONS FOR PROGRESS

Replacing the original 3½-ton Type 32E two-wheel-drive shuttle cars with 4½-ton Type 6SC cars with four-wheel drive and steer was largely responsible for the jump from what was formerly considered good efficiency—425 tons per shift (*Coal Age*, April, 1950)—considering bottom conditions. Other improvements include larger mine cars and the adoption of roof-bolting in places where drawslate occurs.

SHUTTLE CARS transfer via elevator to mine cars (left) which move back and forth in trips of six and are spotted without uncoupling. At right, loaded shuttle car approaches transfer station on planked roadways covered by muck.

SHUTTLE-CAR ROADWAYS are 75% planked because of water and soft bottom. Spaces between planks provide slots for trailing cables.

Drawslate was less when the former performance of 425 tons per machine per shift was being achieved. In addition to the increase in tons per man from 17 to 24.7, tire life in miles of travel and tonnage hauled is at least double what it was with two-wheel-drive shuttle cars.

Solon No. 3 mine was developed via the present haulage slope in 1943 in a 1,200-acre tract of 60- to 84-in Bon Air No. 2 coal near the eastern border of Putnam County approximately 100 mi north of Chattanooga and midway on a 200-mi stretch of U. S. Highway No. 70 between Knoxville and Nashville. The tipple, located at the slope portal and equipped for screening and hand picking, is served by the Tennessee Central Ry. Markets are principally domestic and steam, and at present a large part of the output goes to the Watts Bar plant of TVA for pulverized fuel.

Drawslate averaging 15 in and secured by roof-bolting occurs in about 75% of the working places. Wood posts are used where the immediate top is strong sandstone. The bottom is 4 to 5 in of rash on top of a 2-ft stratum of soapstone.

Small lenses of pyrites and pyritic sandstone make it necessary to use portable air compressors and jackhammers for drilling the coal for shooting, which is done with permissible explosives. A few local rolls are encountered in the generally level seam, but the severest grades do not exceed 5%. Track haulage from the elevators to a dump hopper at the bottom of the slope belt is approximately 4,000 ft.

THREE LOADERS EMPLOYED

Mining at Solon No. 3 is based on driving rooms 30 ft wide and 200 ft deep both ways from triple-heading panel entries. The panel entries, in turn, are driven off the main entry on 480-ft centers. The longest panel to date is 2,050 ft.

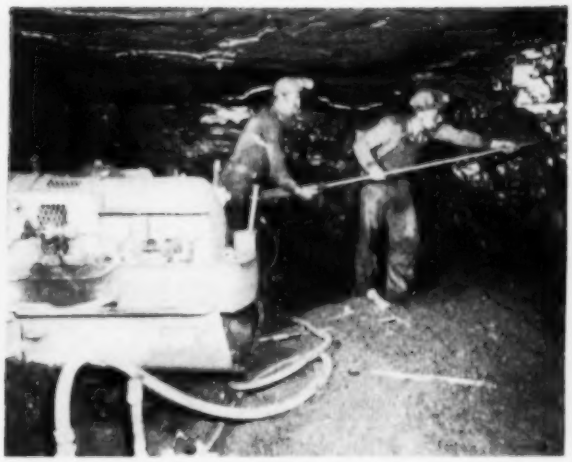
Shuttle cars are equipped with 500 ft of trailing cable, and the maximum shuttle-car travel is 450 ft. Six of the new 6SC cars move the coal from three Joy 14 BU loaders. Two of the loaders, working in rooms, are operated by 20-man crews, including the foreman, while the third loader, developing entries, is operated by a 12-man crew, also including the foreman.

In addition to the loader and shuttle cars, equipment for a production unit includes a Jeffrey 35 BB shortwall using Joy Sulmet bits; a Joy T2-B low-pan truck, a Joy PL 11-14 elevator, a Joy WK 29 portable compressor, a Joy SAE 91 stoper, and a Joy L-37 rock drill for drilling the coal.

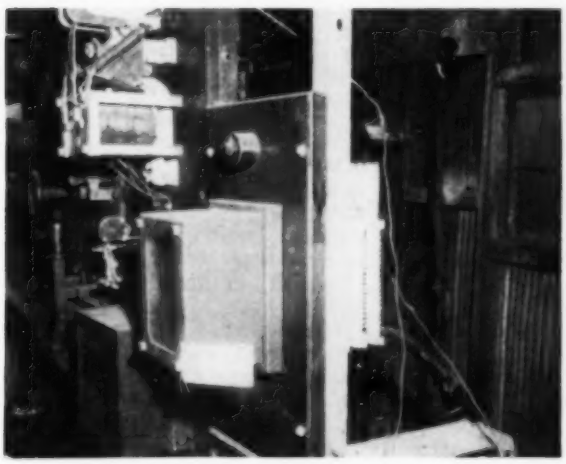
Wide-work crews are made up as follows: one foreman, one mechanic, two loadermen, two machinemen, two drillers, one stoper man who handles bolting with the assistance of the drill crew, two shuttle-car drivers, two floormen (installing planking), two "scrappers," one timberman, one loading-conveyor man (elevator), one pumper and two motormen.

Track-haulage equipment normally in use consists of five locomotives each pulling six dropbottom cars and never uncoupling. Each locomotive hauls from an elevator to the slope bottom. At the elevator, the motorman remains on the locomotive to spot the cars as the trip is loaded. Of 32 new 4½-ton Sanford-Day automatic dropbottom cars recently purchased, 12 have been installed to replace that number of 3½-ton cars of the same make and type. The locomotive list, including a spare, is as follows: two General Electric 6-ton, one Goodman 8-ton, one Goodman 6-ton, two Good-

SHORTWALLS transported on low-pan trucks handle cutting at Solon No. 3.



PYRITES prevent auger drilling of coal. Instead rock drills supplied by portable compressor are employed.



LOAD-DISTRIBUTING RELAYS for substations improve power continuity and raise productivity.

PORTABLE COMPRESSORS supply both coal and roof drills. Bolting and drilling are done at the same time.

man 4½-ton and one Westinghouse 6-ton.

PLANKING ROADWAYS

Roadways for shuttle cars are made of 2x6 lumber 12 ft long—mostly beech, oak and birch. Four pieces are used as runners or sleepers, in other words, two close together on each side under the lines of wheel travel. The cross planks are nailed to the sleepers with 40D spikes—two at each point where a plank crosses a sleeper. Cross planks are spaced to leave 3-in cracks between. Trailing cables crossing roadways can be placed in these cracks, permitting equipment to use the roads without damaging the cables. Planks are not recovered.

Coal and roof drilling are done at the same time. Shot holes are 1⅝ in by 5 ft. Roof bolts are placed on 5-ft centers. The bolts are ⅞-in slot-and-wedge units with 6x6-in steel plates. Bolt lengths are 24, 36 and 48 in. Anchorage is in strong sandstone in the main roof. In the few sections of the mine where there is no drawslate, support is provided by wood posts.

Before roof-bolting was introduced, the drawslate was held by 6x6-in wood crossbars. After about 48 hr, sagging of the slate often bent the bars, reducing coal production from the section for a day or two while the loose top was taken down and loaded out.

NEW RECORD—OLD MACHINE

Tennessee Coal Co. officials proceed on the basis that good maintenance keeps machines in good producing condition. The 14 BU that loaded 1,055 tons in one shift and helped chalk up an average of 1,755 tons for eighteen consecutive working days, as an example, was a machine that had been used at the mine for several years and had received a general overhauling by the All-State Div. of National Mine Service. The 20-man crew that marked up the single-shift record was led by Foreman H. W. Randolph. Names of the other men are given in the caption accompanying the crew photo. All men at the mine are members of the United Mine Workers of America.

Another factor in excellent tonnages over long periods is the system employed in moving elevators at Solon No. 3. Production crews move their own units and the loss in coal-loading time is only 2 to 3 hr. Only 14 of the crew men do the moving. The first step is drilling holes for shooting the top for height at the new elevator location. When this is completed, the drill crew and cutters go about their regular jobs of preparing places.

Every man of the 14 engaged in moving is kept busy at some phase of

LEFT-SIDE LOADER CREW—front row, C. Vanderpoll (left), Dorton Stamps and Tom Eldridge; second row, James Emberton, Jake Phillips, Willie Pirtle, Charles Matney, Talmage Looper, Carl Randolph, Walter Owen and Dan Phillips; rear row, Harry Talkington, Ernest Beaty, Lester Phillips, Oliver Pirtle, Walter Lewis, E. Buckner, Ernest Rankin and Haskell Swallows.

DEVELOPMENT CREW—front row, Bill Fritz (left), Coleman Buckner, Bill Randolph, Emby Phillips and Talmage Buckner; rear row, Martin Murphy, Earl Hodge, Hollis Whittaker, Carlin West, Odell Poston and Luther Crabtree.

TENNESSEE COAL MANAGEMENT—seated, General Reeves (left), fireboss; W. T. Ray, secretary-treasurer, and Hollis Whittaker, foreman; standing, Harry Talkington, assistant superintendent; Manuel Powell, chief electrician and master mechanic; H. W. Randolph, foreman; and Jim Randolph, superintendent. Bill Isbell, foreman, and W. G. Irvine, president, were not present.

the operation. The jobs are rock shooting, rock loading, moving and setting the elevator, laying three pairs of 30-ft rails to extend the track, bonding, hanging trolley and telephone wire, moving nips, and flooring the bottom of the elevator ramp.

Nine pumps are required to dewater the mine. Seven are 5x5-in Gould units, one is a 200-gpm Ingersoll-Rand centrifugal and the ninth, near the slope bottom, is a 500-gpm I-R centrifugal driven by a 25-hp AC motor.

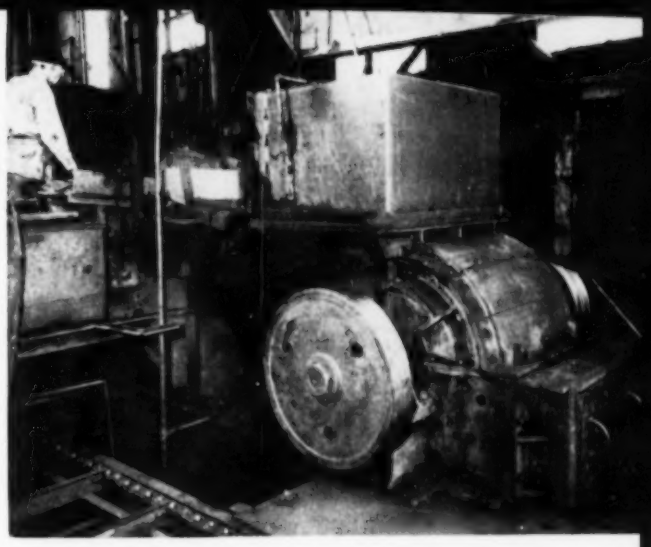
Mine cars are weighed at the slope bottom on a Fairbanks scale with Print-O-Matic attachment. These weights show the performance of each unit each shift. On the tipple, a wooden structure, three men are employed as pickers.

BETTER POWER HELPS

An improvement in mine power helped in establishing the records at Solon No. 3. Substations comprise one 150-kw m-g set on the outside and three similar-sized units underground. Last year, each was equipped with an I-T-E load-distributing relay. By temporarily lowering the voltage on an overloaded set, these relays forestall many interruptions. The idea for their installation, reports Manuel Powell, chief electrician, came from material in *Coal Age*. Hose-McCann sound-powered telephones are used for dispatching, communication between sections, and communication with the outside shop.

Total company employees, including the tipplemen, maintenance men, a bookkeeper and a night watchman, is 71, and the average number working is 70. This latter total was used in arriving at the figure of 24.7 tons per man-shift for the 18 consecutive working days.

Special Crusher Reduces Picking Load



EMPLOYING a special crusher developed for reducing or eliminating the need for pickers at mines operating washers, the St. Ellen mine of the Perry Coal Co., O'Fallon, Ill., controlled by the Midwest Radiant Corp., has reduced its picking force from three to one man. Bearing the serial number 3218, the crusher—an American Pulverizer 30-S heavy-duty unit—was the first of its type to be installed at a coal mine. It is one of five American units in the St. Ellen plant.

St. Ellen mines the Illinois No. 6 seam, and the 30-S crusher is employed to break down all coal over 7 in from a total output of around a million tons a year. A shaker screen eliminates all material under 7 in, and the remaining large product, plus all rock, slate and sulphur balls, goes through the crusher and from it to the washer.

Before installation of the 30-S unit, a roll-type machine was employed, and three men, according to Superintendent John B. Harvey, were required to remove rock, slate, sulphur balls and other foreign material the roll machine could not handle. Now only one man is employed, and his main duty is to remove wood and tramp iron.

The 30-S crusher was delivered in May, 1950, and has handled an average of 210 tons per working shift since that time, or a total of approximately 157,500 tons. No replacement parts have been necessary, and recent inspections have shown no signs of wear. The unit is quiet in operation and has never choked up.

How the Top 15 Coal-Producing Groups Ranked in 1952

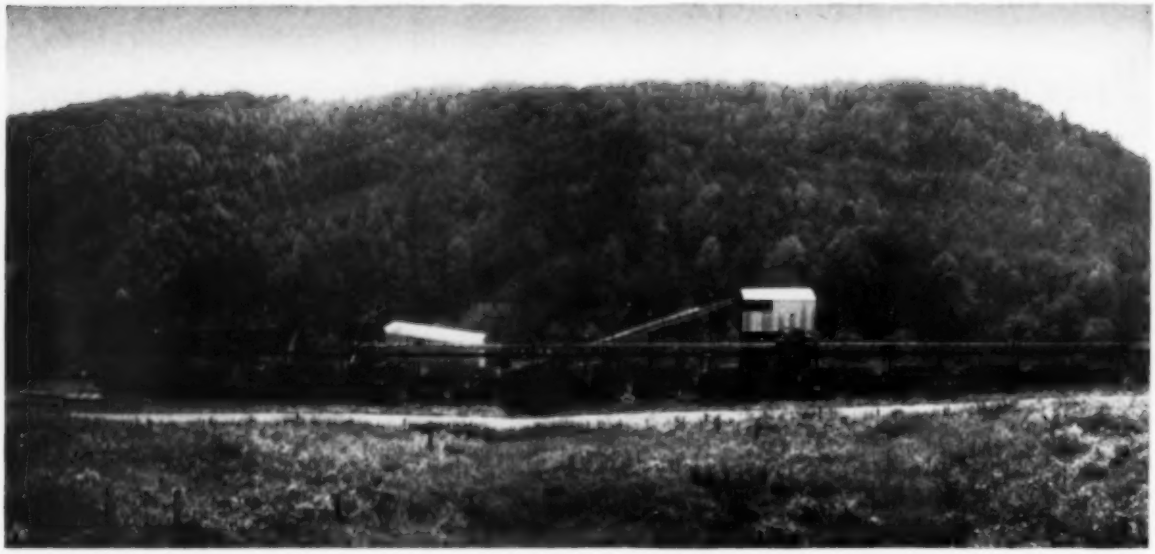
Group or Company	1952 Tonnage	% Change 1951 to 1952	1951 Tonnage	% Change 1950 to 1951	Standing 1952	1951	1950	1941
Pittsburgh Consolidation*	25,700,730	—8.0	28,169,957	+12.8	1	1	1	..†
U. S. Steel*	19,241,478	—11.1	24,460,019	+9.9	2	2	2	1
Eastern Gas & Fuel*	11,050,059	—9.2	12,179,977	+17.7	3	3	4	2
Peabody Coal	9,258,362	—23.0	12,028,149	—0.9	4	4	3	3
Sinclair Coal—								
Southern Coal Group*	8,879,936	—0.5	9,368,467	—1.3	5	6	13	29
Island Creek-Pond Creek	9,024,048	—19.2	11,168,737	+29.5	6	5	5	5
Pittston Group*	8,040,621	+9.7	7,329,237	+14.9	7	9	9	..†
Truax-Traer*	7,976,155	—7.4	8,613,220	—2.0	8	8	8	17
Bethlehem Steel	7,698,617	—12.5	8,800,301	+14.3	9	7	6	8
Pocahontas Fuel*	6,155,607	+4.8	5,869,391	+23.8	10	13	16	10
Glen Alden*	6,040,192	+7.0	5,646,573	—16.4	11	15	7	7
Berwind-White*	5,994,762	—0.5	6,317,630	+17.2	12	10	12	9
Philadelphia & Reading*	5,182,566	+0.7	5,143,728	+0.1	13	16	15	12
North American Group	4,907,416‡	—15.3‡	4,546,944	+13.3	14	17	22	37
Old Ben	4,854,268	—18.7	5,971,452	+1.2	15	11	10	23
Total	140,004,817		155,613,782					

* Record better than national average. ‡ Includes Rail & River Coal Co. acquired in 1952. † Before merger.

1952 OUTPUT of the top 15 operating organizations was 140,004,817 tons, against 157,580,447 tons for the 15 ranking groups in 1951, according to this tabulation compiled by Joseph R. Forsythe, general manager, *Keystone Coal Buyers' Manual*, a *Coal Age* affiliate.

Collectively, the 15 leaders of 1952 had a loss of 10.3% in tonnage from their 1951 total of 155,613,782 tons, but they still did better than the industry as a whole, which was down in 1952 an estimated 12.4% under 1951. In fact, four companies, including the two anthracite producers, boosted their tonnage in 1952, and another six had losses less than estimated national average.

Two new names appear among the ranking 15 companies this year, the North American Coal Corp. and the Philadelphia & Reading Coal & Iron Co., although it is not the first time that P&R has been in the group. Inclusion of North American followed its acquisition of mines of the Rail & River Coal Co. Pittsburgh Consolidation Coal Co. continued to hold its place as the top industry producer, increasing its share of the total bituminous output from 5.2% in 1951 to 5.4% in 1952. These top 15 producers accounted for 27.7% of the total estimated output of bituminous and anthracite coal in 1952.



ELEVATED SHUTTLE BELT conveyor on narrow-gage track supported by 7-in oilwell casing reinforced with 6-in channels, permits loading 40 railroad cars without moving the cars. Two tracks receive coal from the 30-in belt conveyor.

New Shuttle Belt Loader . . .

Simplifies construction at the Haywood Coal Co. . . .

Saves cost of a large fill, bridge and railroad extension . . .

And permits loading 40 railroad cars without moving the cars once they have been set in

BELT CONVEYOR (left) carries deep-mined coal to a belt elevating conveyor which delivers day-shift coal to a chute (center) leading to an apron feeder which feeds coal to the tipple, or discharges to a stockpile (right).

How the Shuttle Belt Loader Works

A COAL AGE OPERATING IDEA applied to its new tipple at the Ten Mile mine near Dola, W. Va., helped the Haywood Coal Co., Fairmont, W. Va., save the cost of a large fill, bridge and railroad extension. The installation permits loading 40 railroad cars without moving the cars once they have been set in by the switching engine. Two tracks, holding 20 cars each, receive coal from a 380-ft 30-in belt shuttle conveyor. Haywood officials obtained their idea for this type installation from an operating idea appearing in *Coal Age*, July, 1951 (p 104).

"This installation has saved us lots of money and permits economic, uniform loading of coal. We might not be operating here if we had to do all the high-cost construction work necessary for a standard installation," declared J. G. Kidwell, president, Haywood Coal Co., Fairmont, W. Va., in discussing the new installation with *Coal Age* editors.

Seven-inch oilwell casing reinforced by 6-in channel, spaced 20 ft apart between tracks, supports a 760-ft elevated narrow-gage track on which a belt shuttles back and forth while loading railroad cars. The conveyor is mounted on flanged wheels and moves back and forth similar to a railroad car on a track. A diverting gate and two discharge chutes are incorporated in each end of the unit.

Power for the shuttle belt is furnished from a 440-v AC power circuit. Trolley-slide-type contacts to three wires transmit power to the motors.

Coal from the slope mine is conveyed to the tipple or to a stockpile by a 30-in belt conveyor. The stockpile is made up of coal mined on the second shift. Underground operations are on a two-shift basis while the tipple operates only on the day shift. A Tournadozer pushes coal from the stockpile onto an apron feeder discharging to an elevating conveyor delivering material to the picking, crushing and screening plant. After coal is hand picked it passes to a McLanahan-Stone single-roll crusher for reduction before being sized on an Allis-Chalmers 6x16-ft single-deck Ripl-Flo vibrating screen.

A flight conveyor elevates sized coal to the shuttle belt conveyor for delivery to railroad cars. Push-button panels, located at each end of the shuttle belt, permit one man to control coal feed to the belt and distribution of coal to the railroad cars. Six men handle all operations around the tipple for both shifts of mining operations. Installation and construction of shuttle-belt unit was done by Interstate Engineers & Constructors, Fairmont, W. Va. Archineer Design Associates, Fairmont, cooperated in design.

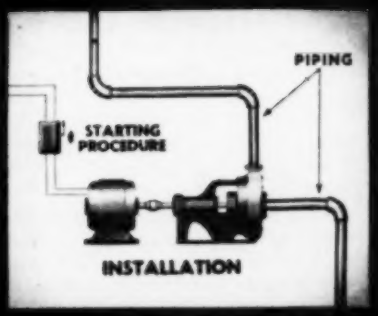
PREPARED COAL is elevated by scraper conveyor to the shuttle belt for loading into railroad cars. Feed to the belt may be varied by the operator.

ONE MAN, operating the shuttle belt loader from push-button control panel at either end of conveyor, regulates feed to belt and distribution to cars.

CONTROL PANEL permits operator to energize the 440-v AC power circuit. Three copper wires mounted under the belt furnish power to the belt loader.

PUMP MAINTENANCE

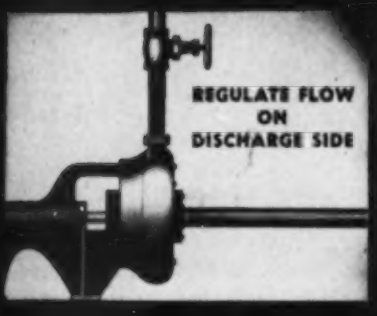
Here are some down to earth tips on how to maintain your centrifugal pumps. The illustrations are taken from a new Allis-Chalmers slidefilm, and the text is based upon the film's commentary.



1 In using centrifugal pumps, the nub of the matter is to set them up right in the first place. Then follow through by checking from time to time to make sure the original conditions remain and the pump is getting the reasonable care it should have.

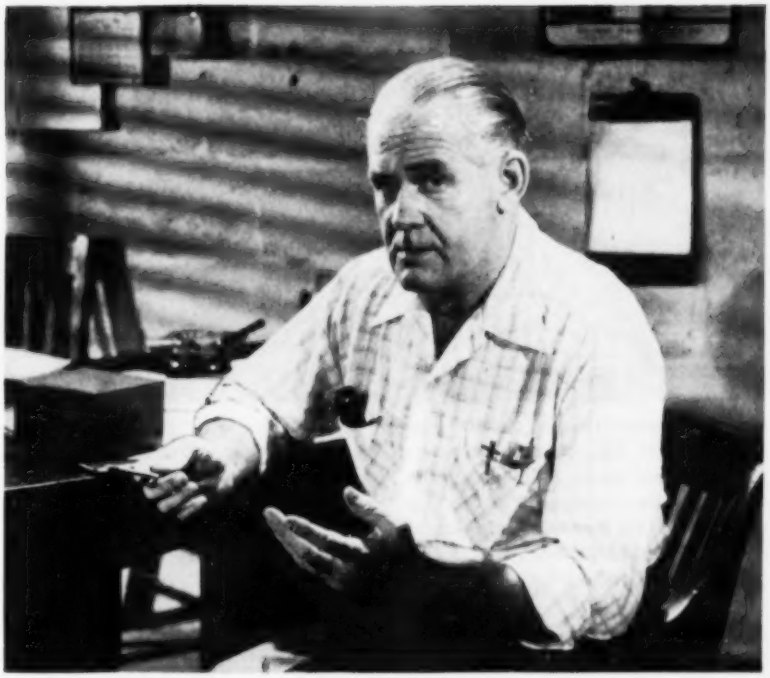
2 Take an interest in this science of pumping and pump performance. Build up your knowledge of pumps, at least to the point where you will know enough not to open a priming petcock while the pump is running. Learn what they will and won't do.

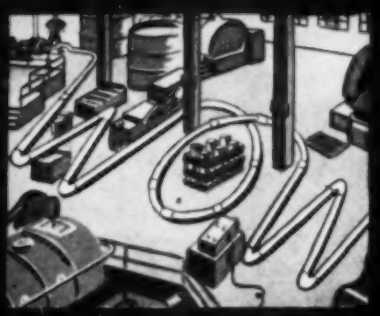
3 In setting up, you must consider three points: pump installation, piping and starting facilities. Ideal suction piping would consist of a straight tube from the supply to the pump. Such a set-up usually is impossible, but don't go to the other extreme . . .

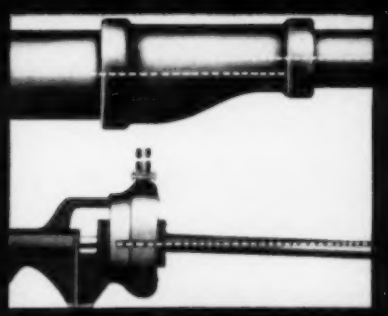


7 Regulate the flow on the discharge side, not the suction side. Any regulating valve should be on the discharge side. Then if it is closed, the water supply to the pump will not be shut off. The only exception is the . . .

"From what I've learned as a maintenance supervisor, I'd be glad to give you some hints on good practice to help you get longer life and better service from your centrifugal pumps."





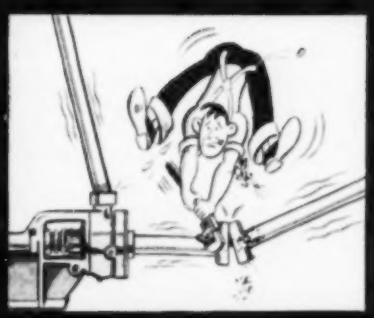


4 WOW! You'll have to be sure your lines don't just grow like Topsy. Any time you spend in intelligent planning of the layout will be more than repaid in better pump performance. In any event, when you plan a pump, make every effort to . . .

5 Keep it simple! Use as few bends and elbows as you can get by with . . . you'll have to study your own pumping job to find the best pump location to meet these conditions.

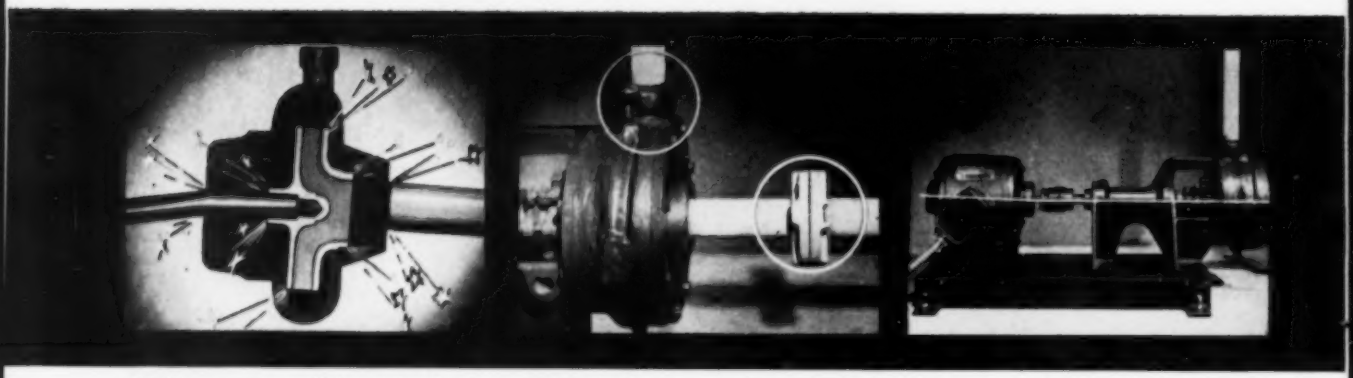
6 And another thing comes to mind. Keep all suction piping sloping downward away from the pump to keep air out of the lines. Install reducers flat side up for the same reason. Air in the suction line will cause the pump to lose prime.

8 Foot valve at the intake of the suction line. When the pump stops, this valve closes and traps liquid in the suction line to keep the pump primed. It should have a strainer to keep trash out of the pump.



9 Don't ever do this, please! With enough muscle power, you probably can scrunch everything together, but it won't be long until . . .

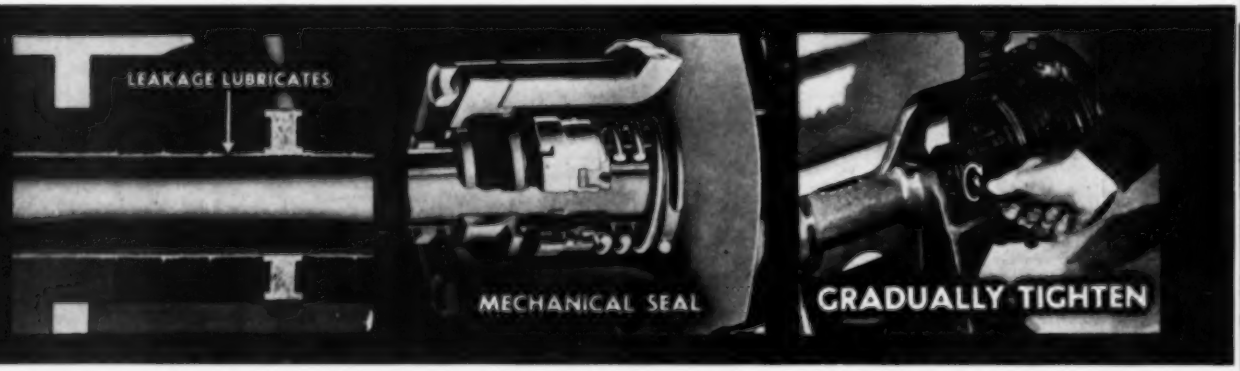
MORE



10 Your pump will be seriously injured by the abuse. Remember, the time you spend in planning the installation and properly setting up the pump will be repaid in better performance, and lower maintenance costs. The shaft and impeller in this one are all finished.

11 Here's the way to do it. Suction and discharge lines are of the proper length and they enter and leave the pump without strain. Also, it's a good idea to use pipe compound at all joints to keep air out of the system.

12 Correct alignment really begins with the mounting. When pump and motor are out of line, the bearings and shafts of both pump and motor are strained, and you get excessive wear, vibration and noise.



16 Leakage lubricates the packing. The material being pumped finds its way out along the shaft in just the right amount to keep the packing from drying out. Other pumps may have . . .

17 Mechanical seals that present no lubrication problem. In any event, when a pump equipped with a stuffing box is running, there should be a drip from the packing. If there is more than a slow drip . . .

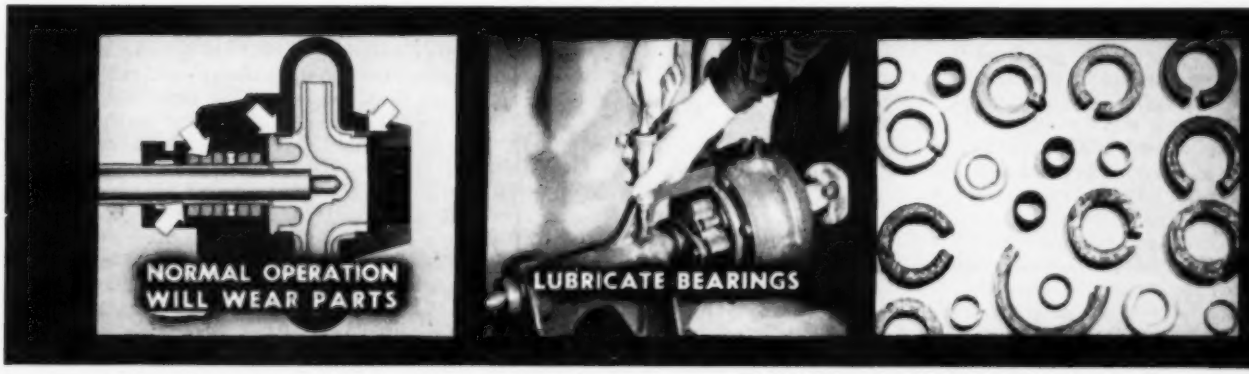
18 Gradually tighten the gland until the leakage is right. A word of warning: Never let a pump run dry. Therefore, be sure it's primed before you start it. This may mean filling the suction lines and pump casing by external means.

22 If pump efficiency falls off, suspect the wearing rings in the casing. They are designed for relatively easy replacement and they have a striking influence on the efficiency of the pump. They can be removed by heating the casing or chilling the ring.

13 However, with V-belt drives you need only reasonable alignment between the two sheaves because minor misalignment can be taken up in the sheaves and V-belts.

14 Be sure the pump runs in the right direction. A pump running backward will deliver some water, but it won't deliver anywhere near its rating. That's why you should check the manufacturer's instructions to find out which way it should turn.

15 Then look at the stuffing box. If the packing runs dry it will burn out and it can score the shaft sleeve. Packing keeps the water in and the air out. Sometimes it is lubricated under pressure, and sometimes . . .



19 Normal operation will wear out some of the parts. They should be checked periodically and replaced when they are worn too much to do a good job. And check again to see that set-up conditions "stay put."

20 Bearings will have to be lubricated. Use enough of the right kind of lube, and that means not too much. Too much lubricant can defeat its own purpose by stirring up excessive friction, which is particularly true in anti-friction bearings.

21 When the time comes to replace packing, remove the old, clean out the box, then be sure to put in the right kind of packing! Stagger the packing joints about 90 deg so the liquid can't find a straight path through the gland.

23 In short, your pump-maintenance program should concentrate on servicing and replacing the parts that show wear in normal operation, such as packing and wearing rings. Periodically inspect and clean the impeller.

24 To be happy with your pumps, set up a schedule for their care, keep tabs on how they're performing and—never let them run dry! And if you want the essentials of good pump practice in a nutshell, remember, set them up right and give them good care.

Granddaddy Mines in America

Who operates the oldest coal mines and where. The record goes back to 1792 in anthracite and 1842 in bituminous.

HOW LONG can a coal mine live and produce? A lot of years it seems, in some instances, on the basis of reports to *Coal Age* on the oldest operations still active in the United States. Fifty years is fairly common and there is a sprinkling of major operations 75 yr or more old, this in spite of the fact that new mines brought in in World War II and since represent replacement of approximately one-third of the present bituminous productive capacity. Replacement in the anthracite industry has been at a lower rate but still has been significant.

Which are the great-and the great-great-granddaddies? Three of them are found in the bituminous industry. Oldest is the Consol No. 1 mine of the Consolidated Fuel Co., Ocean, Md., operated by William E. and William S. Jenkins, respectively president and secretary-treasurer, and both with a long history in the industry.

The other two great-granddaddies are found in the Kanawha field of southern West Virginia. They are: Coalburg mines, Coalburgh-Kanawha Mining Co., and Winifrede mine, Winifrede Collieries. Both turn the 100-yr mark in 1953. The *Coal Age* survey also uncovered a few other operations that were winding up 100 yr or more of service and were in the process of being closed.

GREAT-GREAT-GRANDDADDY

Honors for the great-great-granddaddy of them all go to the anthracite industry. The No. 9 shaft of the Lehigh Navigation Coal Co., Inc., at Lansford, Pa., is mining in the same tract originally opened in 1792 and known in the early days as Summit mines—in other words, over 160 yr of producing history. Philip Ginter discovered coal here in 1791 and the Lehigh Coal Mine Co. was organized the following year. Quarrying was the first method of mining, but the owners soon went underground, using the breast-and-pillar system. Big headaches were two: a market and a means of transportation, with the Lehigh River about the only medium in those early days. Deep mining eventually was supplemented by stripping—the famous Summit Hill operation. Production now comes from the 2d and 3d Levels of No. 9 shaft.

RIVERS AND COAL

Rivers and their man-made counterparts—the canals—burgeoned with the anthracite industry until the modern railroad system was well on its way. Rivers also provided the major transportation for the early bituminous mines until the railroad networks were developed. The Coalburg and Winifrede mines, for example, were set up for river shipment, either loading directly into flatboats—and later towboats—or using short railroads, originally laid with wood rails, to get the coal to the river.

Coalburg loaded directly to the river via an incline in its early days. Development started with Col. William Henry Edwards, a young New York attorney, who bought 85,000 acres of coal on the south side of the Kanawha River shortly after 1847. Part was sold to R. H. Maury, including what is now the Coalburg property of 1,450 acres. He started mining in 1853, shipping down the river in flatboats. The property reverted to William Seymour Edwards, son of William H., who operated it until his death in 1915. It was then taken over by John Augustine Willis, who formed the Coalburgh-Kanawha Mining Co. in 1916, and now owns it with his family, including Mrs. Willis, granddaughter of William H. Edwards, and John Jr, vice president and general superintendent. The company has recently opened a new mine with modern equipment and looks forward to many more years of operation.

Winifrede mine, also shipping by river in its early days, resulted from organization of the Winifrede Mining & Manufacturing Co. Feb. 16, 1850, which acquired the present property April 18, 1853, following construction of the Winifrede Ry. in 1851 and '52. Mining was done by slaves in accordance with common practice. Like others, also, the original company experienced marketing and financial vicissitudes, and ownership passed to the Winifrede Coal Co. and the Winifrede Co., lessor to Winifrede Collieries, which started operations Jan. 1, 1931, and is now headed by D. H. Morton.

RAILROADS AND COAL

Development of many fields and many mines in areas where water transportation was not available awaited, in addition to markets, the construction of railroad facilities. Otherwise, it is a fair guess that the number of mines with over 50 yr of producing history would be considerably greater. The Upper Buchanan field of Virginia, for example, did not become a major factor in the industry until railroad development in the early 30s, permitting opening of the first major mining operation—Home Creek—in 1932. First coal from the Gay mine, in the Logan field, shipped Thanksgiving Day, 1904, had to be hauled to a railroad siding at Logan. And, as a further example, the Hazard field of Kentucky did not become possible until the first railroad was built in the period 1912-16.

The close connection between railroad construction and mining is further illustrated by such examples as the Pocahontas mine. It was completely built and equipped with supplies hauled in from the railhead at Saltville, Va., before the railroad was completed in 1882. It shipped its first coal in June, 1883.

Since stripping with the progenitors of the modern equipment used today is relatively new, only one strip operation, according to the data developed, appears as the oldest operation in its field. It is the Ayrshire No. 1 (Patoka) mine, of the Ayrshire Collieries Corp., Oakland City, Ind.

The record for other fields than those mentioned previously is shown in the accompanying tabulation. It is the result of voluminous correspondence and considerable checking in the field, and *Coal Age* expresses its thanks to the many men who made the survey possible. Some errors there probably are. *Coal Age* naturally will appreciate being advised about any that have occurred.

Oldest in Their Fields and Still Mining Coal

ALABAMA

1888 SAYRETON MINE, Republic Steel Corp., Sayreton, Ala.

ARKANSAS-OKLAHOMA

1908 JEWEL MINE, Jewel Mining Co., Paris, Ark.

COLORADO-NEW MEXICO

1888 PICTOU MINE, Colorado Fuel & Iron Corp., Walsenburg, Colo. (Southern Colorado Coal Co., Colorado Fuel Co.).

ILLINOIS

1903 ST. ELLEN MINE, Perry Coal Co., O'Fallon, Ill. (Taylor Coal Co.).

INDIANA

1919 AYRSHIRE NO. 1 (PATOKA) MINE, Ayrshire Collieries Corp., Oakland City, Ind. (Globe Coal Co., Patoka Coal Co.).

KENTUCKY—BIG SANDY-ELKHORN

1911 MINE 204, Consolidation Coal Co. (Ky.), Jenkins, Ky.

KENTUCKY—HARLAN

1911 WISCONSIN STEEL MINE, International Harvester Co., Benham, Ky.

KENTUCKY—HAZARD

1914 ALGOMA MINE, Algoma Block Coal Co., Lothair, Ky. (Kentucky Jewell Coal Co.).

1914 EBLEN MINE, Eblen Coal Co., Glomawr, Ky. (East Tennessee Coal Co.).

1914 SUNFIRE MINE, Kentucky Sun Coal Co., Combs, Ky. (Himyar Coal Co.).

KENTUCKY—WEST

1901 SKIBO (LUZERNE) MINE, W. G. Duncan Coal Co., Greenville, Ky.

MARYLAND

1842 CONSOL NO. 1 MINE, Consolidated Fuel Co., Ocean, Md.

MONTANA

1906 SMOKELESS & SOOTLESS MINE, Brophy Coal Co., Red Lodge, Mont. (Smokeless & Sootless Coal Co.).

NORTH DAKOTA

1922 INDIAN HEAD MINE, Dakota Collieries Co., Zap, N. D.

OHIO

1902 MINE NO. 3, Powhatan Mining Co., Bellaire, Ohio (Gorrell Coal Co., Rail & River Coal Co.).

PENNSYLVANIA ANTHRACITE—NORTHERN FIELD

1866 NO. 1 MINE (originally Gypsy Shaft, No. 1 Colliery), Pennsylvania Coal Co., Dunmore, Pa.

PENNSYLVANIA ANTHRACITE—SOUTHERN FIELD

1792 NO. 9 SHAFT (originally Summit Mines), Lehigh Navigation Coal Co., Lansford, Pa.

PENNSYLVANIA—CENTRAL

1873 ROCKHILL NO. 1 MINE, Rockhill Coal Co., Robertsdale, Pa,

PENNSYLVANIA—WESTERN

1872 ADAMS MINE, Westmoreland Coal Co., Irwin, Pa.

PENNSYLVANIA—THICK FREEPORT

1901 HARWICK MINE, Duquesne Light Co., Harwick, Pa. (Allegheny Coal Co.).

UTAH

1890 CASTLE GATE MINE, Independent Coal & Coke Co., Castlegate, Utah (Utah Fuel Co.).

VIRGINIA—SOUTHWEST

1892 TOMS CREEK MINE, Blue Diamond Coal Co., Toms Creek, Va. (Virginia Iron, Coal & Coke Co.).

VIRGINIA—UPPER BUCHANAN

1932 HOME CREEK MINE, Home Creek Smokeless Coal Co., Home Creek, Va.

VIRGINIA-W. VIRGINIA—POCAHONTAS-TUG RIVER

1883 POCAHONTAS MINE, Pocahontas Fuel Co., Inc., Pocahontas, Va. (Southwest Improvement Co., Pocahontas Collieries Co.).

WASHINGTON

1890 ROSLYN NO. 3 MINE, Northwestern Improvement Co., Roslyn, Wash.

WEST VIRGINIA—NORTHERN

1890 KINGMONT MINE, Virginia & Pittsburgh Coal Co., Kingmont, W. Va.

WEST VIRGINIA—CENTRAL

1898 NORTON MINE, West Virginia Coal & Coke Corp., Norton, W. Va.

WEST VIRGINIA—GREENBRIER

1920 CRICHTON NO. 1, Johnstown Coal & Coke Co., Crichton, W. Va.

WEST VIRGINIA—KANAWHA

1853 COALBURG MINES, Coalburgh-Kanawha Mining Co., Coalburg, W. Va. (Old Dominion Coal Co., Kanawha & Ohio Coal Co., Robinson Coal Co., Coalburgh-Kanawha Coal Co.).

1853 WINIFREDE MINE, Winifrede Collieries, Winifrede, W. Va. (Winifrede Mining & Mfg. Co., Winifrede Coal Co., Winifrede Co.).

WEST VIRGINIA—LOGAN

1904 GAY MINE, Gay Coal & Coke Co., Mt. Gay, W. Va.

WEST VIRGINIA—NEW RIVER

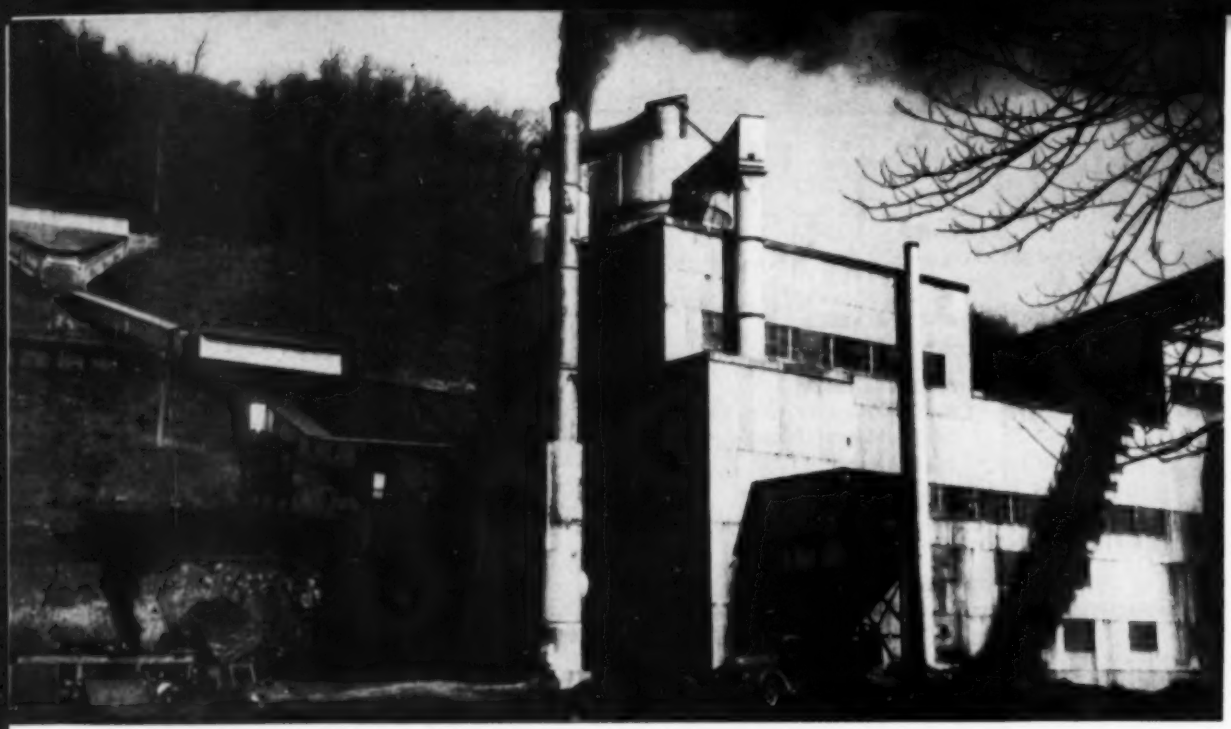
1872 ANSTED MINE, Gauley Mountain Coal Co., Ansted, W. Va. (Hawk's Nest Coal Co., Ltd., London).

WEST VIRGINIA—WILLIAMSON

1900 GLEN ALUM MINE, Ames Coal Co., Glenalum, W. Va.

WEST VIRGINIA—WINDING GULF

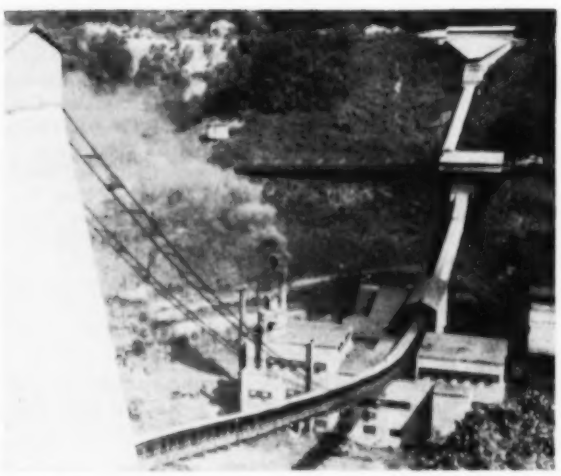
1907 SLAB FORK MINE, Slab Fork Coal Co., Slab Fork, W. Va.



NEW WASHER

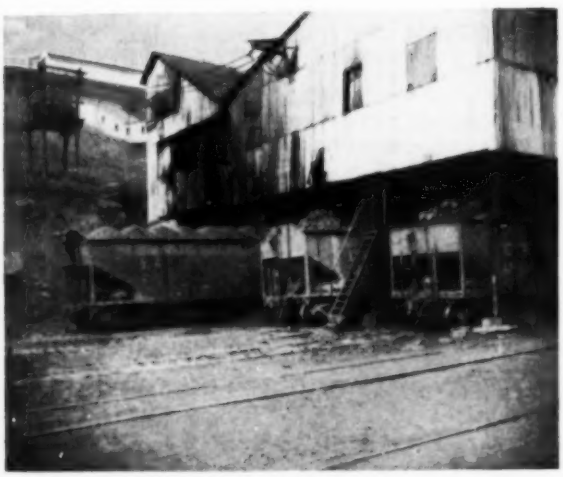
BUILT PRIMARILY to produce premium stoker, new washing and drying plant placed adjacent to older tipple (rear) is currently handling 250 tph of 5x0, with a reject of 10%. New facilities helped push up running time of its property at Alva, Ky., to make it one of the largest in Harlan County, the Black Star Coal Co. found.

Modern Black Star Plant Builds Domestic Markets



TWO MINES

WASHER AND TIPPLE, serving two openings alternately, are shown from the dumphouse of the newer No. 4 mine, with the suspended 48-in belt conveyor in the foreground and the dumphouse of No. 5 mine on the far hill.



4-TRACK TIPPLE

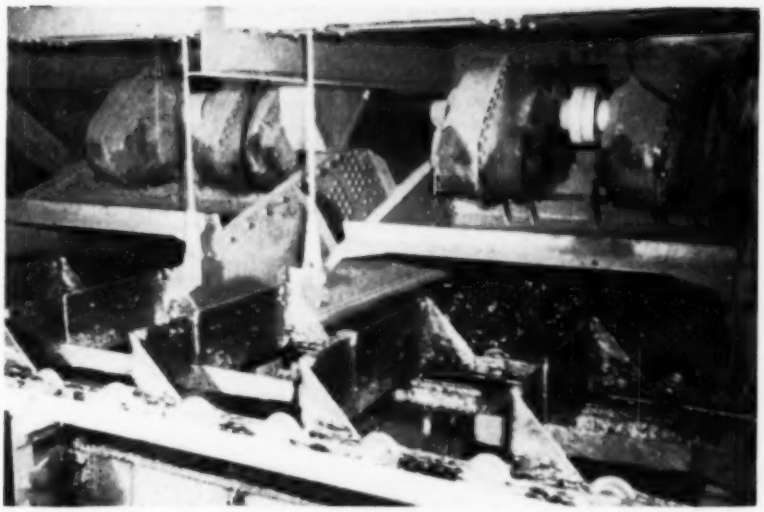
STEEL TIPPLE, built in 1923 and later modernized with addition of vibrators, handles primary screening, secondary screening of washer products, crushing, mixing and loading of 50 railroad cars a day.

WASHING

INCOMING 5x0 is washed in this 5-cell air-operated jig. Plant cuts ash in stoker from previous 7 to 8% down to 2½ to 3%; ash in carbon from former 12 to 13% down to 6 to 7%.

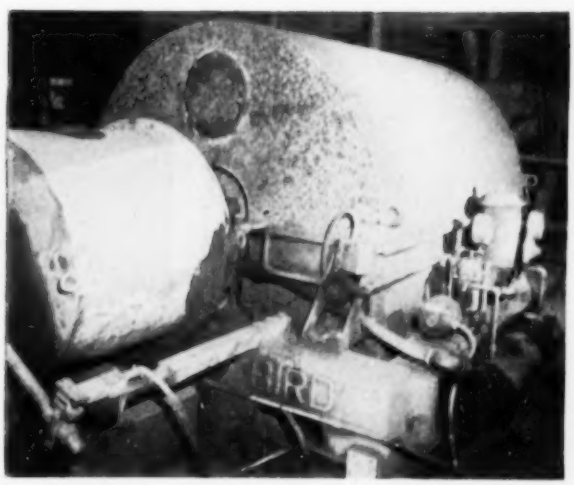
DEWATERING

TWO 6x16-FT VIBRATORS operating in parallel dewater and screen 2x0 from a primary dewatering screen, with 2x¾ made on the top decks and ¾x¼ on the bottom. Similar screens handle dual jobs of dewatering and screening at various stages.



DRYING

TWO VERTICAL CENTRIFUGALS wring water from the ¼-in by 28-mesh, which then passes via a series of four drag conveyors to a ½-ton surge bin and from there via a screw conveyor to a flash drier operated at its top limit.



FILTERING

WITHOUT THIS CENTRIFUGAL FILTER which cleans the effluent from the vertical centrifuges, the washer system would have to be cleaned twice as often, 2½% of the carbon would be lost and considerable water wasted.

Story Continues on Next Page

How Black Star Plant Builds Markets And Boosts Running Time...Begins on p 102

WHAT CAN a modern preparation plant do for an operation?

Increased running time in a rather static domestic market and a growth in production that makes its property one of the four largest in Harlan County are among the benefits derived from the new plant of the Black Star Coal Corp., Alva, Ky. Designed primarily for making premium stoker coal, the new washing plant is handling 250 tph of 5x0-in coal, with a reject of 10%.

Utilizing an air-operated jig and centrifugal and flash driers, the Black Star plant cut the ash in its stoker coal from the previous 7 to 8% down to 2½ to 3%, and has reduced the ash in the carbon from 12 to 13% formerly to 6 to 7%. Among other features is a horizontal centrifugal filter installed to clarify and conserve water. Waste water and sludge is pumped into an abandoned section of the mine, a disposal method that provides adequate settling area while avoiding stream pollution.

Mechanizing Brought Problems

Mechanical loading in the Black Star mines began on an extensive scale in 1946 with installation of Joy 14 BU loaders and Joy 32-E shuttle cars. About that time, or shortly afterwards, dirtier coal was encountered in the workings. Considering everything, a cleaning plant loomed as a necessity —to permit complete mechanization, place the coal in better markets and provide better running time.

The new washing and drying plant that resulted was located in a separate steel building adjacent to the existing steel tipple, which has extensive screening, crushing and mixing facilities. The new plant, designed and built by the McNally-Pittsburg Mfg. Corp., went into operation in April, 1950. The improvement has enabled the Black Star operation to become one of the four largest producing mines in Harlan County. Including Black Star, four mines in the county now are equipped with mechanical-cleaning plants.

How Quality Preparation Works

A drag conveyor bringing 5x0-in coal from the tipple to the washing plant discharges into two sluices feeding the 5-cell McNally-Norton automatic washer. Float from the washer flows through a launder to an Allis-Chalmers Low-Head primary dewatering vibrator equipped with 3-in screen on the top deck and 2-in on the bottom deck. The washed and dewatered 5x3 and 3x2 fall into separate compartments of a drag conveyor returning them to the tipple.

From this primary dewatering vibrator, the 2x0 passes through a launder to two Allis-Chalmers Low-Head 6x16-ft secondary dewatering vibrators working in parallel, each with ¾-in screen on the top deck and ¼-in on the bottom. The 2x¾ and ¾x¼ (the latter called natural stoker) return to the tipple in separate compartments of another drag conveyor.

Leaving the secondary dewatering vibrators, the ¼x0 passes via a launder to a 65,000-gal concrete sludge tank containing a drag conveyor 8 ft wide with chains 240 ft long (wrap length). The gathered sludge is elevated to the top floor by a dewatering bucket elevator.

The ¼-in sludge then goes to an Allis-Chalmers Low-Head 6x16-ft dewatering vibrator fitted with 28-mesh wedge-wire stainless-steel screen. The minus-28-mesh flows down to a settling cone.

The ¼-in by 28-mesh moves by a wet screw conveyor and a wet scraper conveyor to two McNally-Carpenter Size MCI-C centrifugal driers, each currently handling 29 tph. The ¼-in by 28-mesh product is carried by a series of four "wet" drag conveyors to a ½-ton surge bin, from which a screw conveyor feeds it into the column of a Combustion Engineering Raymond flash drier using a furnace equipped with a spreader-type stoker of the same manufacture. The heat-dried carbon, accumulating at the base of the

CONNECTED HORSEPOWER in washer totals 609½, with all motors operating on 220 v. Largest motor in plant is 150-hp 1,180-rpm unit (left) driving flash-drier fan. Circulating pump is powered by 125-hp 1,180-rpm motor (right).

CONVEYOR from bottom of flash-drier column takes material to outside hopper bin for recirculation through plant.

cyclone collector at the rate of 40 tph, passes to the tipple via a series of five drag conveyors.

Effluent from the Carpenter driers, which contains some fine solids, flows to the settling cone previously mentioned, from the bottom of which the water and concentrated solids are pumped to a Bird centrifugal filter. The resulting filter cake joins other material enroute to the flash-drier column. Effluent from the Bird filter flows to the 65,000-gal sludge tank.

Since for this particularly difficult drying problem, the flash-drier's capacity is pushed to the limit, considerable balled material drops undried to the bottom of the column. This material is elevated by a drag conveyor to a hopper bin outside the building, from which it is hauled by truck and dumped into an R-O-M bin for recirculation through the plant.

Positioned over Track 4 of the tipple is a 240-ton storage bin for mixing the washed ¼ x0 and the ¼x0 degradation obtained from making stoker by crushing the washed 3x2 and washed 2x¾. Tipple equipment for small coal includes two Jeffrey crushers (30x30-in double-roll and 30x60-in single-roll) and three Allis-Chalmers Ripl-Flo screens. One vibrator has a 1-in screen on the top and a solid bottom deck, while the other two have 1-in top and ¼-in bottom decks.

Primary screening is done with a shaker equipped with a 5-in round-hole screen. The lump moves over a picking table (two men picking) enroute to a loading boom on No. 1 track. Three of the four loading tracks are equipped with booms. The plant has a Viking spray system to treat any grade, and Ashland Oil Co.'s Permatreat oil is being used. Sizes loaded on the four tracks are as follows: No. 1, block; No. 2, egg; No. 3, stoker-nut or any of five grades; and No. 4, ¼x0 carbon.

Reject from the washing plant, adding up to 10% of the feed, is hauled away by a truck carrying 4½ tons per load. The plant operates two shifts and the truck works each shift.

The structure of the new washing plant is steel and concrete, with a flat top covered with gypsum slabs protected by built-up roofing. Sheathing is corrugated galvanized steel and the floors are concrete, except for steel grating for part of the top floor.

General Electric furnished the power center, consisting of three 333-kva Pyranol transformers, and also the starters, which are grouped in Cabinetrols and, along with the transformers, are located on the top floor. Most of the motors are the General Electric Tri-Clad type, although the largest motor in the plant is a 150-hp Westinghouse unit driving the flash-drier fan. All motors operate on 220 v and connected horsepower in the washing plant totals 609½.

Water Wastage Avoided

Two main pumps take care of the plant. The circulating unit is a McNally-Pittsburg 12x12-in pump, rated at 4,000 gpm and driven by a 125-hp motor. Sludge is elevated to the Bird filter by a Weinman 3x3-in pump. Placed in a separate pumphouse, a 6-in McNally-Pittsburg pump driven by a 125-hp motor elevates waste water and clean-out sludge to an abandoned section of the old Harlan mine. This method of disposal eliminates stream pollution and provides a means of settling and filtering so that the water can be used over again.

The important role the Bird filter plays in the plant was proved by a breakdown making it necessary to operate for several weeks without it. After only 10 shifts, the entire system had to be cleaned out, including wash box, sump pump and end of the sludge tank. Each cleaning means a loss of 90,000 gal of water, a serious factor during dry weather. With the Bird filter in operation, 20 shifts are worked between system cleanings. Without the Bird unit, about 2½% of the carbon coal is lost and 75% more makeup water is required.

The fresh water supply comes from an underground storage pool in the Harlan seam, using as its source an overlying creek which is diverted into the mine through two 8-in boreholes 85 ft deep.

Two Mines Served

R-O-M coal enters the preparation plant on descending 48-in belt conveyors from the two sides of the valley. Both coals are the same, but since plant capacity is not large enough to serve both conveyors at the same time at their present speeds, the plant is run alternately on coal from the two sides.

The plant operates two shifts without stops between shifts or stops for lunch. Production per shift is usually 50 railroad cars (averaging 52 tons per car). A Femco public-address system with five stations in the washer and one in the tipple facilitates communication.

After the washer was put into operation and hand-picking of the stove and egg ceased, trouble arose as a result of pieces of cap boards and other splinters of tramp wood passing through the shaker screen with the 5x0. The difficulty was solved by designing and installing a skimmer basket of 2-in screen at the discharge end of the wash box (see p 118).

Newer Mine Opened

When the steel tipple was built in 1923, it received coal from a cardump hopper that is now the lower of the two hoppers on the left-hand side of the hill (looking up the valley). In 1944, the portal for that side was changed to eliminate a long outside haul, which entailed building a new bin at a higher elevation with a retarding conveyor down to the original bin. This mine is known as No. 5.

Also in 1944, the Harlan seam was opened on the right-hand side of the hill and a rope-suspended descending belt conveyor installed to lower the coal down to the tipple. The car dump hopper feeding this retarding conveyor holds 1,100 tons.

The new right-hand side, called No. 4 mine, operates in 32- to 46-in coal with the following equipment: six Joy 14 BU loaders; 12 Joy 32-E shuttle cars; four Sullivan 11-B shortwalls; two Jeffrey 35BB shortwalls; five Jeffrey 7A electric coal drills; and five Chicago Pneumatic No. 572 drills. Shooting is done with Airdox where the coal is thickest and with permissible powder where it is thinnest. When tried in coal of 32 in or thereabouts, Airdox did not break the lumps sufficiently for the economical use of loading machines. Shuttle cars discharge into 30-in Ladel section belts 2,000 ft long. For main haulage, 6-ton Sanford-Day automatic drop-bottom cars are employed.

On the left side, Mine No. 5, the coal ranges from 32 to 38 in and the equipment list includes: seven Goodman shakers driving hand-loaded pan lines; one Joy 20 BU loader (new in September, 1952, and capable of working in coal as low as 30 in); two Joy 8-SC shuttle cars; 10 Chicago Pneumatic electric coal drills; and one Ladel 30-inx2,000-ft belt. Shooting is with permissible powder, and 6-ton Sanford-Day automatic dropbottom cars are also used on this side for main haulage. As yet, no roof-bolting is being done in the Black Star mines.

Local operating officials are: Harry Gaunt, assistant to the president; R. L. Nichols, plant manager; John Aslinger, superintendent; E. L. Mays, mining engineer; Earl Ward, preparation foreman; and George Fultz, night preparation foreman.

Albert B. Hill is president of the company; B. F. Reed, executive vice president; Harry M. Carr, treasurer; and R. H. Shelly, chief engineer, all with offices in Louisville. The company maintains its own coal-sales organization, also at Louisville, headed by T. E. Coleman, vice president in charge of sales; B. M. Gallagher, manager of sales; and R. F. Phelps, fuel engineer.

PROSPERITY IN THE USA: How Deeply in Debt Are We?

How prosperous *are* the people of the United States? Previous messages in this special series have answered this question in part by recording the progress—relatively slow progress—we have made in increasing both the income and the wealth per person in the USA.

This fourth and concluding piece of the special series deals with the extent to which our prosperity should be discounted because it has been accompanied by an increasing volume of debt. Many correspondents have suggested to us that an individual or a nation can temporarily increase prosperity by borrowing, but in so doing lives on both borrowed goods and borrowed time. Our purpose here is solely to throw light on the question of whether or not we are now in that unenviable position.

On January 1, 1953, the total debt of the United States government and of its citizens was $627 billion, as shown in the table below. On its face, a debt of this magnitude, which represents about $3,900 of debt for each person, suggests that we are heavily debt-ridden.

TOTAL DEBT – PUBLIC AND PRIVATE

Federal government debt	$267 billion
State and local debt	30 "
Private debt	
Corporations	195 "
Individuals	135 "
	$627 billion

The burden of our debts, however, does not depend simply on their size. It depends in much more decisive degree on our capacity to carry the load successfully. This capacity, in turn, is partly a matter of attitude, and attitudes defy objective measurement. A community that gets very jittery about its debts has less capacity to carry its burden successfully than one that does not. But the accurate measurement of jitters, present or prospective, still remains to be mastered.

Capacity to Carry the Debt Load

Nonetheless, it is possible to throw some light on our capacity to carry the debt burden by studying key economic elements that can be measured with some degree of accuracy. The following paragraphs indicate how some of these key economic elements stand.

Compared with our national income, the total volume of our debts, public and private, is still well below the level of 1929, when it proved to be too big for the good of the country. Our total debt is now 113% greater than the national income whereas in 1929 it was 146% greater.

There are several other cheering facts about our debts. One is a sharp decline in interest rates which makes the cost of carrying our debts relatively much less than it was in 1929. It took 8% of our total national income to carry our debts in 1929; it takes only about 5% of the income today.

More Cheering Facts

We also have much more ready cash now than in 1929. Today individuals and corporations hold a total of $269 billion in cash or its equivalent which is almost twice as much as the portion of private short-term debt (about $140 billion) that is subject to sudden demand for payment.

Many students of the subject cite the relatively low cost of carrying our debts and the large volume of cash on hand, and reach the comfortable conclusion that our debt burden is nothing to worry about. In further support of this view they emphasize the fact that no important part of our debt is owed abroad. Hence, they reason there is not the danger, so conspicuous in Britain since the end of World War II, that our economy will be upset by the necessity of making heavy debt payments to other countries.

Some Dangers of Present Debt

However, the nature of our debts presents dangers that it would be foolish to ignore. This is true of both the debt of $267 billion owed by the federal government to its citizens and the $330 billion in private debts owed by some citizens and corporations to others.

Public debt can be a dangerous kind of debt because government has the power to print money or to create its equivalent by expanding bank credit. Of the $215 billion that the federal government borrowed during World War II, over $90 billion was borrowed from banks. This was the largest single contributor to the inflation of prices that since the war has robbed the dollar of about half of its purchasing power, and thereby robbed the buyers of government bonds of about half the purchasing power these bonds were supposed to represent.

If, as is quite possible, a new emergency should again require the federal government to borrow heavily while its debt remains so high, it is doubtful that the public would be avid to buy its bonds. Hence, the government might again be forced to resort to the inflationary process of relying on bank credit.

Private debts can be dangerous if the people take on new debts more rapidly than is justified by the growth of business or by their ability to repay. Last year bank loans were increased by the imposing sum of about $6½ billion, which represents an increase of about 11% in total loans outstanding. This is almost twice as much as the increase in the volume of business over the same period. Installment credit for consumers increased by $3 billion last year, again an increase in debt about twice as great as the increase in business volume in the fields where the credit was used. It is also the fastest rate of such growth in our history.

Constructive Use of Credit

So long as the expansion of credit does no more than keep pace with expansion in the volume of business, the expansion is constructive. Also, when credit is expanded to acquire resources and equipment that will enlarge the volume of business a little later, that use is clearly constructive. But when private credit expansion begins to run ahead of business growth, it is time for us to be heads up. Such credit expansion courts price inflation. It also creates a forced draft under business so that, if credit is cut off, there may be a painful drop.

To give a summary answer to the question: *Is the level of debt in the United States a danger to our prosperity?* – the answer seems to be, "Not at the moment." We owe nothing abroad. The interest burden on present debt is relatively small, and we appear to have the resources to handle the short-term debt. Yet both the total amount of debt and the recent rapid increase in total private debt, especially the latter, are enough to signal for caution. We need restraint on the part of business and consumers to avoid expanding private borrowing at an excessive rate. The federal debt needs to be reduced and put in more manageable form. If these things are done, we can proceed to build a sound prosperity.

McGraw-Hill Publishing Company, Inc.

ECONOMICS IN ACTION:

What Would You Do Without Tools?

. . . You and your family are about to get in your car

When suddenly everything made by man vanishes . . .

SUPPOSE EVERYTHING made by man suddenly disappeared from the world. What would you do?

You wouldn't have tools of any kind. Unless you could find a cave, you would have to build a shelter. By tearing branches from trees, you could probably fashion a rude hut which you could cover with a coating of leaves and clay. And it wouldn't be long before you'd get hungry. Perhaps you would find some berries or nuts, or some edible wild plants or roots. If your aim was good enough, you might fell a rabbit or a bird with a stone, and if you were quick enough you might catch a fish with your bare hands. But since you had neither a cigarette lighter nor matches, you would have to eat everything raw.

It would soon dawn on you that all you had to work with were two things—nature and your own energy. If you only had some tools. Right there you would get a lesson in what had created the American way of life that you had left behind. It was tools!

You would also get a better idea of what tools are. A jacknife is a tool, and how you wish you had one. But you'd discover that anything at all that is helpful in wresting a living from nature is also a tool. In the America that had vanished, the machines in the mills and factories were tools. But so were the plant buildings and the land under them. On the farm, the cultivated land used to raise crops and the barns, silos and corn cribs were just as much tools as the plow, the tractor and the combine. The railroad trains and the motor trucks that criss-crossed the country were also tools because they hauled goods to points of use.

Possibly for the first time you would realize how much the America of 1953 owed to the improvement of its tools. And you would get a keener appreciation of the ingenuity that was used in devising better ways of using tools. Sometimes the addition of an attachment to a machine increased its output, or the rearrangement of machinery and floor space gave a better flow of materials.

It would become clear to you that all these developments had but one purpose—the production of better goods and services with less time and human energy.

And you would understand how these improvements were brought about. Obviously, it was because America spent part of its money for tools instead of spending it all for food, shelter and comfort.

Many of America's tools, you would recall, were so expensive that it required the pooled savings of many people to pay for them.

Come to think of it, most adult Americans helped buy the tools of industry. They did it directly by buying corporation stocks and bonds. They did it indirectly through their life insurance premiums and bank deposits which were used by the insurance companies and banks in buying corporation stocks and bonds.

It was a good system that they had in America and you wish you could get back there. You have learned the value of tools the hard way—by being forced to get along without them. If you only had the opportunity, you would know what to say to your old friends and neighbors.

You would point out that tools mark the chief difference between the America of 1953 and the primitive life you had to lead. You would tell them that there is no limit to America's future progress provided it continues to improve its tools. The extent that tools are improved, you would emphasize, depends on the amount of money people are willing to spare from day-to-day needs to pay for them. It takes a lot of savings to buy modern tools.

Reprinted from *US Steel News*

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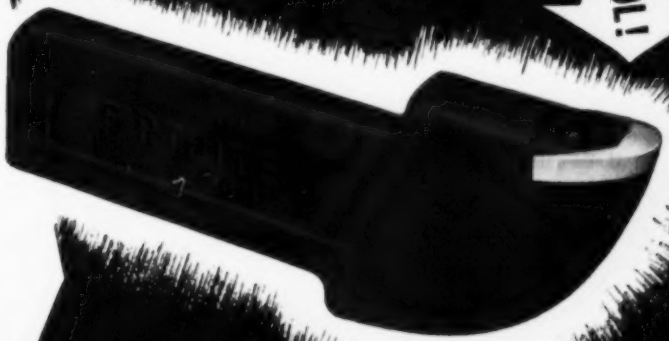
"Blue Bit" Mining Tools from

AUSTIN POWDER COMPANY Stocks!

In the heart of every mining district there is now an Austin Powder Company stock of FIRTHITE "Blue Bit" Mining Tools for immediate delivery. To serve you better than ever, Firth Sterling, the manufacturer, and Austin Powder, as national distributors, have "teamed up" to put FIRTHITE "Blue Bits" *where* you need them, *when* you need them.

You can count on this rugged, dependable, proved-in-the-mine line of machine bits, auger and roof drill bits and finger (strip) bits in styles and sizes to meet every mechanized mining need.

THE STRONGEST BRAZE IN ANY CARBIDE TOOL!



Designed with cutting edges on 3 sides to eliminate tool wear, binding and power drag. Special alloy steel shank.

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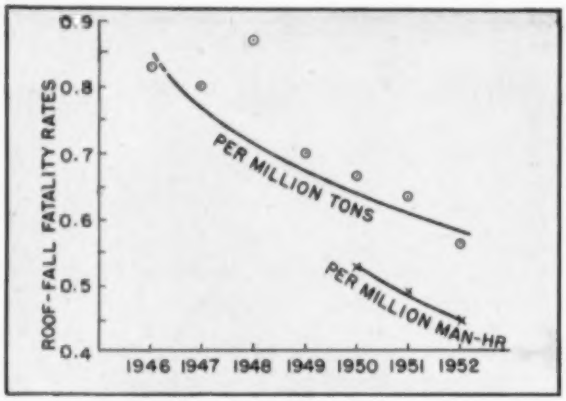
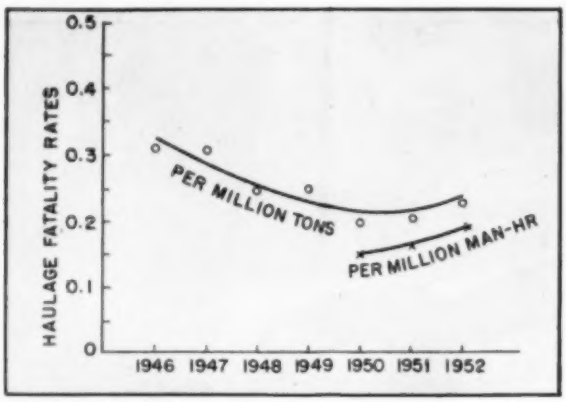




ROOF-FALL fatality rates are skidding . . . BUT SEE what's happening in haulage.

Improving Haulage Safety

THE ADVENT OF ROOF-BOLTING with its safety benefits and the continuing realization that falls of roof, rib and face are the No. 1 killer appear to be having the desired effect upon roof-fall fatality rates. The trend, as shown in the left illustration, is generally downward despite the shocking increase in 1948.

But while progress in controlling the accident plague in one quarter is commendable, the disease has broken out of bounds in another. The haulage fatality trend is turning the wrong way!

In 1952, haulage accidents claimed 117 lives in both anthracite and bituminous coal mines. That was equal to the toll in 1951, even though production and working time in 1952 were lower than in 1951. The ominous trend, prepared from unrevised figures in annual fatality reports of the Bureau of Mines, must be viewed as a tocsin. It would be "whistling in the dark" to assume that this turn of events is merely an unfortunate, temporary condition that will cure itself in time.

How can the curves be turned downward again? It can only be done, in the foreman's sphere, by revitalized application of more of the same: Instruction, inspection and supervision.

TEACHING HAULAGE SAFETY

The training efforts of state and federal officials must be supplemented by training on the job. Only one man can do the job. That's you!

As you will recall, some time ago in Foremen's Forum [March, 1952—Ed.] we discussed the five elements of good teaching. They are (1) explanation, (2) demonstration, (3) interrogation, (4) application and (5) examination. You can follow this sequence to the letter in dealing with new haulage employees, but with experienced men you might better apply the last three points with diligence and the first two with more subtlety. Don't repel the veteran by trying the "kindergarten" approach. You can be sure he knows his job, however, by asking him questions to make him think about his work and safe habits. And don't be discouraged by the brakeman who says, "Why, I forgot more about car-punching than most fellows ever knew." He probably has forgotten more than he thinks he did. Haulage accidents involve experienced men, too.

Be on the lookout for unusual mental

How Are You On . . .

Keeping Up With New Developments?

THIS IS ANOTHER in a continuing series of quizzes designed to keep you thinking about your job and its responsibilities. But this time, rather than giving you an easy "yes" or "no" choice, we ask you to probe your memory and frame your own answers. Ours appear on p 112.

1. What new machine, unveiled in 1952, received rave notices for its ability to mine coal underground without men going with it?

2. Approximately how many men were killed in the nation's anthracite and bituminous coal mines in 1952?

3. In your opinion, what is the most promising technical development over the past few years that might reduce the appalling roof-fall-fatality totals?

4. Which of the 48 states now mines the most coal?

5. Was coal production in 1952 higher or lower than in 1951?

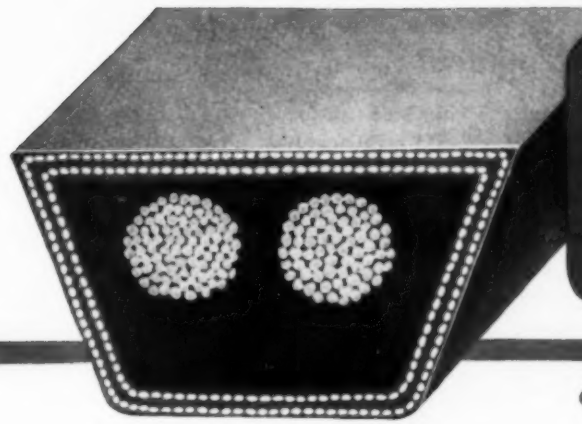
6. Approximately how much of our coal now comes from strip mines?

7. Under the terms of recent negotiations, how much money per ton-of-coal-produced goes into the UMWA welfare fund?

8. What new type of machine is being used to increase strip-mining recovery after the highwall becomes too high for conventional stripping?

9. Who is the former coal industry official now serving in President Eisenhower's cabinet as Secretary of the Treasury?

10. Chemicals from coal open a new market for our product. What large company built a new plant to produce such chemicals, and where is the plant?



TEXROPE GROMMET V-BELTS

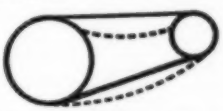
What is a Grommet?

It's the endless rope of strong cords that pulls the load. It's twisted for strength . . . positioned in the belt so every cord pulls its full share of the load . . . and flexible to reduce internal friction. It's unlike anything else on the market.

Grommets Grip Better

Straight sides bulge slightly when belt passes around pulley. This helps give belt its tremendous grip. In addition, grommet belts are more flexible. No need for stiffening plies of cord. This, too, adds gripping power. Size for size, grommet belts give ⅓ more gripping power than ordinary belts, pull heavier loads with a higher safety factor. And less slip means less surface wear.

Grommets Stretch Less



Since there is no dishing, there is more strength in proportion to cord volume — and less stretch. Grommet belts stretch an average of two thirds less than ordinary belts . . . yet withstand shock.

No Dishing with Grommets

Each grommet carries its fair share of the load. In ordinary belts the center cords "dish" under high tension. Dished cords do less work. Grommet belts have no cords in the center of the belt.

3 WAY SAVINGS!

Here's how you save with TEXROPE grommet V-belts:

1. **Grommet belts cut costs — belts are constructed for long life.**
2. **Grommet belts reduce downtime — machines run with few stops.**
3. **Grommet belts cut maintenance — few man hours are spent making unnecessary belt changes.**

Grommets Cost No More. *Texrope* grommet belts cost the same as ordinary belts of the same rating. The savings you make are clear profit.

Grommet belts are made in C, D and E sections. They were developed as a result of cooperative research of Allis-Chalmers and B. F. Goodrich and are made under B. F. Goodrich patent.

Call your nearby Allis-Chalmers distributor or District Office for a set of long life grommet V-belts, or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-3940

Texrope is an Allis-Chalmers trademark.

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MOTORS — ½ to 25,000 hp and up. All types.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge and up.

Keeping Up With Developments

And here are the answers. Five correct answers should be about par for the course, we estimate. Eight correct answers rate superior.

1. The Carbide Miner, brainchild of Carbide & Carbon Chemicals Co. engineers, is a new remotely-controlled machine which has penetrated into a highwall to a distance of 690 ft, and can do better. The operators remain outside, directing the machine from a central control station.

2. According to Bureau of Mines' preliminary estimates, the figures are 447 fatalities in and about bituminous mines and 99 in anthracite. The total, 546 fatalities, is the lowest ever, but it still is a staggering total which leaves no place for complacency.

3. In our opinion, it's intelligent roof bolting. That means setting up an experimental section to try the system under local conditions, choosing the proper bolts and bolting equipment and designing a standard bolting plan.

4. In 1951 West Virginia forged to the front as the leading coal-producing state with a total output of 163 million tons. It was the first time the state had surpassed Pennsylvania's combined output of anthracite and bituminous.

5. It was lower. Bituminous output for 1952 was 465 million tons, a reduction of 70 million tons from 1951. Anthracite production was 40½ million tons, a drop of 500,000 tons from the preceding year.

6. About 23% of bituminous and 26% of anthracite tonnage came from strip mines in 1952.

7. The levy is 40¢ per ton under the terms of the bituminous contract and 50¢ per ton for anthracite.

8. The big auger moves along the foot of the highwall, after other stripping machines have reached their effective limits, to increase total recovery from the pit.

9. George M. Humphrey, formerly chairman of the board of directors, Pittsburgh Consolidation Coal Co., was President Eisenhower's choice to head up the treasury department.

10. Carbide & Carbon Chemicals Co. opened a new $11,000,000 plant at Institute, W. Va., to milk chemicals out of coal. Pittsburgh Consol and Koppers, among others, also were in the field with stepped-up research programs.

attitudes. Illness of the man or among his family, recent bereavement, excessive debts, domestic troubles and so on, can occupy a man's mind to the exclusion of the hazards around him. Remember, too, that a young brakeman in love is not of this world—no facetiousness intended. In any event, when you see careless practices you must take steps to correct them; but try to determine whether the carelessness is a result of preoccupation with personal problems like these. With men in this state of mind, an understanding approach is better than hell raising.

INSPECTING PROMOTES SAFETY

Locomotive brake shoes and linkage, haulage sand, headblocks, chocks, sliders, sprags, rerailers and other such items are vital in promoting haulage safety. Look for them, and if they are not in good condition and where they should be, find out why. Furthermore, the maintenance and proper use of each of these items must be the responsibility of some one man. Among last year's accident reports is the account of how a mechanic was jolted out of the cab when the locomotive he was operating ran into a set of headblocks. He fell in front of the locomotive and lost his life. The report tells how he and another employee became crossed in their signals. Both men thought the other would remove the blocks.

But the inspection that will help prevent haulage accidents goes far beyond the haulage equipment and the men who operate it. Again referring to reports for 1952, a locomotive operator lost his life when his machine hooked the end of a spare conveyor pan lying at the side of the road, causing it to knock out a timber to permit roof to fall on the operator. Be sure to inspect stacks of timber and other supplies along haulageways to make certain there is more than enough clearance. You can prevent accidents only before they happen.

Make a habit of checking the condition of trolley-wire supports. Look into the condition of reel motors and whether or not they operate properly. Inspect the resistor banks for both traction and reel motors by looking between the grids for odd pieces of wire, rail spikes and other makeshift jumpers. When the boys are in a hurry they might try to repair an "open" in the resistance circuits by creating a "short" with a jumper, but that makes an electrical hazard. Make certain that fuse boxes contain fuses, not wires or nails; and, finally, warn operators of the dangers of plugging, unless the locomotive is designed to permit plugging. You know that plugging might possibly shear off pinion teeth or snap the driving axles, and that's like throwing an auto out of gear on a hill. Last year, at least one man was killed trying to leave a runaway locomotive.

Shuttle-car operations require similar attention. Above all, be certain that operators have sufficient overhead clearance and that their cars are mechanically and electrically sound.

SUPERVISING THE SYSTEM

The job of supervising is a catch-all. It includes many duties, such as those of a teacher and an inspector, as previously discussed. Also, it includes some efficiency engineering.

Study your mine or section to see if there are any kinks in the haulage system. Is the work load equalized as much as possible among the haulage crews? Are your switches in good condition? Are sanding points in the best possible location? If your study shows any of these factors out of line, organize your force of day laborers and schedule their work so that undesirable conditions may be corrected, then properly maintained.

Demand a workmanlike job whenever a new installation is made in the mine. Don't tolerate sloppy timbering, trackwork or supply handling. You still have the right to raise your voice on any matter in which safety is involved.

We don't intend to leave you with the impression that all responsibility for haulage safety is being shifted to your shoulders. As mentioned, government agencies are doing a good job of training right among the haulage employees. Equipment designers are providing locomotives with enclosed cabs for operator and brakeman. Telephone communication among locomotives and dispatchers is promoting smoother mine traffic.

The job can't be done, however, without your sincere co-operation in working to prevent such accidents right at the place where they occur. And you can do most for the cause by applying the principles of good supervision in getting your haulage employees to co-operate. They'll appreciate your effort: they don't want to be accident victims.

★ ★ ★

Patience, Unlimited

Recent press stories carry the astounding news that after 37 yr one of Prof. Albert Einstein's assumptions finally has been supported by irrefutable proof.

In 1915, Prof. Einstein published his famous theory of relativity, including a stipulation that if the theory is correct the force of gravity can bend light rays.

Then in 1952, Dr. George Van Biesbroeck, an astronomer from Chicago University, made two trips to Khartoum, Anglo-Egyptian Sudan, with recently developed equipment to support or slay Einstein's assumption.

The first trip was made in February, 1952, to take advantage of a total eclipse of the sun which was visible in that area. Photos of stars almost directly behind the darkened sun were taken. The second trip was made last August, when the same stars were photographed in their identical positions, but this time in the night sky.

Comparison of the photos showed that rays of light from the stars actually were displaced as they passed the eclipsed sun. There was a noticeable deflection in the starlight visible on the daytime photo and not on the night photo. Dr. Biesbroeck calculated it to be 1.70 seconds of arc, or not quite 1/30 of one degree. In 1915, Prof. Einstein calculated that it would be 1.75 seconds of arc.

We're so staggered by the professor's brainpower that we'll not try to draw a lesson or moral from this one.

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Mounting pressures and temperatures in power generation and industrial processing call for Cast Steel Valves. For this increasing need, Jenkins offers a wide selection of patterns that have met the test of the toughest services throughout industry.

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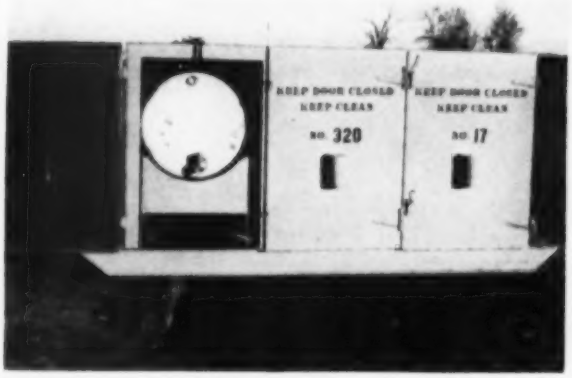
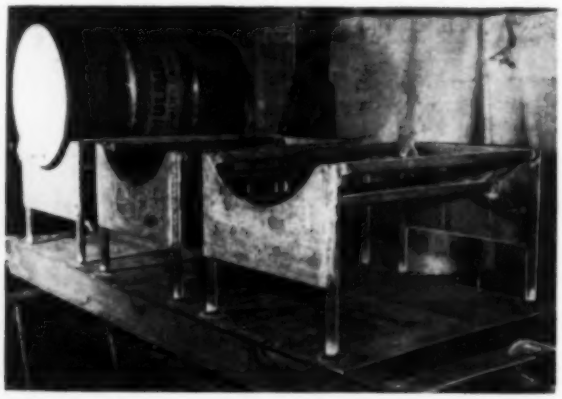
Operating Ideas



NEW fireproof steel oil house holds several days supply of oil and simplifies underground supplying. Numbers on doors indicate type of lubricant in compartment.



ALL-WELDED construction is featured in the oil house. Racks are the same radius as the oil drums. The unit may be towed from either end.

Underground Oil House Simplifies Supplying

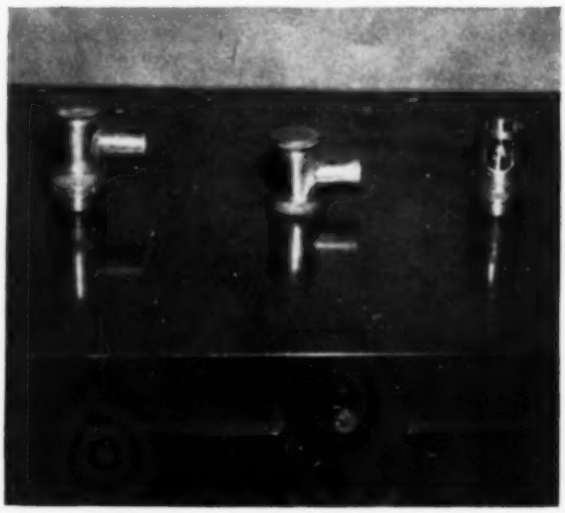
TO ELIMINATE SPILLAGE of oil and grease and to simplify underground supplying, a new skid-mounted three-compartment fireproof oil house has been designed and built by the Bell & Zoller Coal & Mining Co., Johnson City, Ill. Approved by the USBM, one of the units is installed with each underground mobile loading section. Several days' supply of oil and extreme-pressure grease, stored in 55-gal drums, is always kept close to the mining equipment. As mine workings advance or retreat, the oil house is moved with the section equipment.

Six-inch I-beams, connected at each end with 1x4-in flat steel and smaller intermediate cross members, form the base of the new portable unit. Wrought-iron pipe, 1 in in diameter, and $^{3}/_{16}$-in deck plate are used to make the individual barrel supports. A sturdy link, made of 1-in rod, at each end of the base permits easy towing of the unit. Housing and frame work are made of angle iron and ¾-in deck plate. Doors are kept closed by steel pins inserted through two steel rings welded to the door frames.

Skid mounting has been incorporated to keep the height of the unit as low as possible so that full drums can be put in the racks with a minimum of effort. Present height permits a full drum to be tipped over so one end rests on the top edge of the rack. Workers use a combination of lifting and sliding to put full drums completely on the racks. Physical effort is greatly reduced. Full drums of lubricants are hauled from the mine supply car to the oil house by shuttle car.

A new-type spigot, product of an idea of John Mays, shop foreman, and the know-how of Tom Reilly, night machinist at Bell & Zoller's Johnson City shop, permits fast flow of heavy extreme-pressure grease from the oil drum. Types of spigots available were unsatisfactory in several respects: (1) flow of grease was slow, (2) flow cut-off was not always positive and (3) spigots were constantly being broken off. The new spigot solves all three problems.

The new spigot is a two-piece unit, machined from brass and with threaded connections. To get grease from the drum, the spout is turned 180 deg from the up position shown in the oil-house photo. Cut-off is positive when the spout is returned to the up position and there is no spillage, Mr. Mays reports.



SPECIAL SPIGOT, designed and made in the company shop, permits fast flow of extreme-pressure grease from the oil drum.

What's New With You?

WE'RE ALWAYS LOOKING for new or different ways to do mining jobs better, so why not tell us about any ideas or "gadgets" you've made work at your property. Just write us in your own words what it is and what it does, and we'll prepare the final writeup. Besides seeing your idea in print, you'll be paid $10 or more for every usable "Operating Idea" you send us, on publication. Why delay? Write now to: The Editor COAL AGE, 330 W. 42 St., New York 36, N. Y.

Battery Power Saves Money for You on ACCIDENTS THAT NEVER HAPPEN!

The Gould "Thirty"—
America's Finest
Mine Shuttle Car Battery

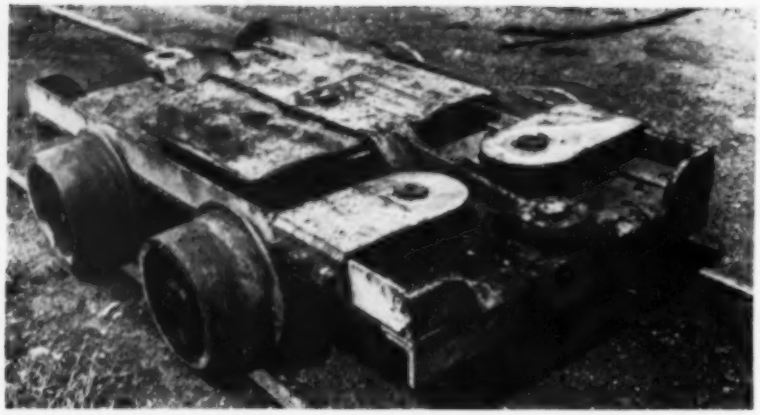
If you're already using lead-acid battery-powered shuttle cars, get full details on the Gould Plus-Performance Plan—a library of technical information that tells you how to select, charge, maintain and determine the condition of lead-acid batteries. It's free. Write Gould Battery Information Headquarters for details.

The accident curve goes down . . . the profit curve goes up, when a mine changes to battery-powered shuttle cars! A comprehensive, independent survey shows that battery cars have a much better accident record on a "per shift" or "per ton" basis. Mines using them save money on the accidents that never happen.

GOULD *Industrial Batteries*

GOULD-NATIONAL BATTERIES, INC., TRENTON 7, N. J.

Always Use Gould-National Automobile and Truck Batteries



DOLLY CAR CUTS LOAD on slope hoist by one-half. It follows the machine carrier into the slope.

Dolly Car Facilitates Lowering Heavy Machines Down Slopes

AT SLOPE MINES it often is necessary to lower heavy machines, such as universal-type cutters, loading machines and the like, preferably as a unit, writes John Lyons, safety engineer, Bell & Zoller Coal & Mining Co., Zeigler, Ill., in submitting a description of a dolly car used to reduce the load on the hoist at Zeigler No. 3 and Buckhorn No. 2 slopes. Where such machines are lowered in one piece, there is a great strain on the hoists, particularly where slope inclination is 30 deg.

To reduce the load pull on the Bell & Zoller hoists, mine officials designed and had built in the shops the dolly car shown in the accompanying illustration. It is 6 ft long and 30 in wide, and is built of ½-in steel plate with ¾ x 4 x 4 angles around the sides and ends. The car shown has 12-in wheels.

In operation, the coupling end of the rope is passed around the 24-in sheave mounted on the center of the car, being guided by the two 7-in sheaves at the rear end. The rope then is brought back and secured to a deadman of sufficient weight and strength to handle the weight of the machine being lowered. This deadman usually is located near the hoist.

The machine to be lowered is secured to the low-type truck employed for transporting loading machines, shuttle cars and the like. The truck then is coupled to the dolly car and leads it into the slope. It will be noted that this system reduces the load on the hoist by one-half.

The large sheave turns on a 2¾-in shaft and the frame is further strengthened by a 1 x 6-in steel strap. The small guide sheaves are provided with 1½-in shafts. All parts are electrically welded.

Shop-Built Drill Rig Features Adjustable Height

BY CHANGING POSITION of the wheels relative to the frame of the drill rig, bank drillers at Bevier Coal Co., Macon, Mo., can drill from immediately over the coal to 20 in above it. Charlie ("Broken Arrow") Davis, pit foreman at the Bevier mine, standing alongside the shop-built machine in the full-view photograph, shows how it's done in the detail photo of one of the wheels on the rig. Lester Amedei, machinist, and John Bammon, chief elec., worked out details.

Cut out a disk of ¾-in plate steel some 8 in in diameter, Mr. Davis explains, and in its center round out a hole big enough to accommodate the axle of the drill rig. Slip the disk over the axle and weld it vertically to the frame.

Next, cut a slab of ¾-in plate steel about 8 in in width and 16 in long and round off the corners so that the ends are arcs on a 4-in radius. In the center of one-half of the plate cut out a hole into which the axle will fit. Slip the plate over the axle, drill three bolt holes through the plate and the disk, and bolt the plate, long end down, to the disk. Now, to the lower end of the plate, weld the spindle on which the wheel will turn and put the wheel on the spindle.

When you've done this for all four wheels of the drill rig, you're in business with a machine the frame of which is 10 in higher than normal.

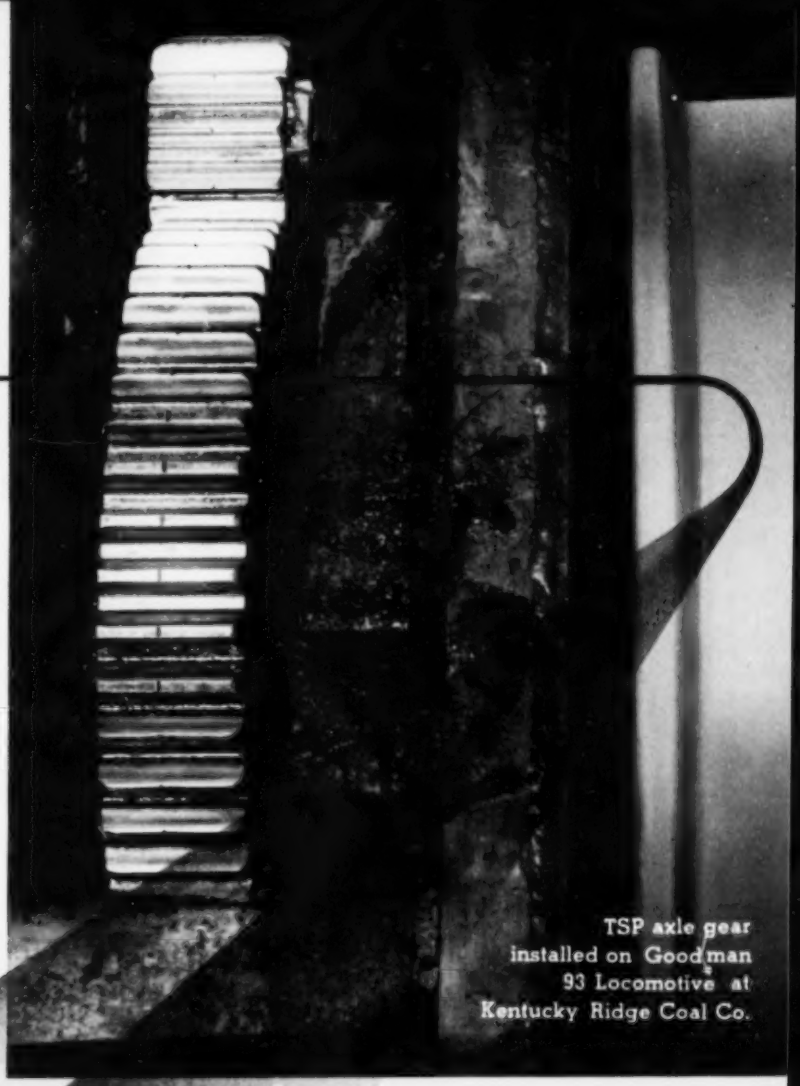
To drop the machine to a position 10 in lower than normal, take out the bolts holding disk and plate together, turn the plate long end up and, in this position, bolt the plate to the disk again. Do this for all four wheels, and the machine drops to a position immediately above the coal, almost touching it.

As shown in the full-view photograph, crowd and reverse levers are located on the control box. The drill is powered by a 15-hp Westinghouse motor; the crowd by a 3-hp G.E. motor through a shop-built speed reducer.

Kentucky Ridge Coal reports...

17 YEARS

OF HARD WORK ... AND PLENTY OF HARDNESS LEFT IN THIS TSP* AXLE GEAR

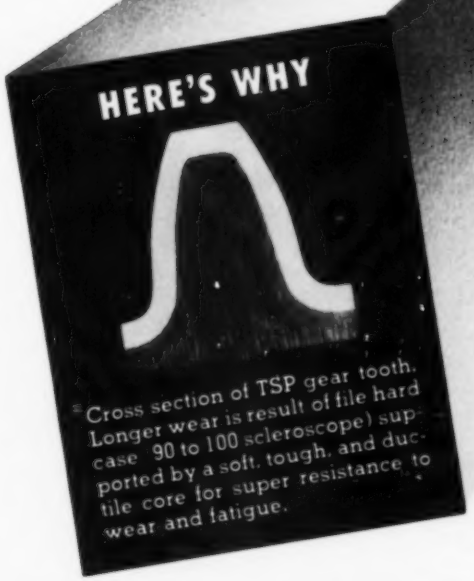


TSP axle gear installed on Goodman 93 Locomotive at Kentucky Ridge Coal Co.

SERVICE RECORD

Competitive Gears	TSP Gears
7 years service only. Gear badly worn — had to be replaced	17 years continuous service, still in operation, hardness only half worn

Dollar wise mine operators save with TSP parts in material, man hours, downtime. Write for Bulletin 948.


HERE'S WHY
*Cross section of TSP gear tooth. Longer wear is result of file hard case (90 to 100 scleroscope) supported by a soft, tough, and ductile core for super resistance to wear and fatigue.

*TOOL STEEL PROCESS PRODUCTS... the products that carry an absolutely positive GUARANTEE to give a longer life in the same service than any other product.

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MORE POWER—GREATER ECONOMY! Expect a wonderful advance in power, performance and economy in Chevrolet heavy-duty trucks! The great 1953 Loadmaster engine—standard on 5000, 6000 Series, heavy-duty and forward control models, optional on 4000 Series heavy-duty trucks—has a new high compression ratio of 7.1 to 1, develops even more horsepower than before. And the Thriftmaster engine in light- and medium-duty models brings you traditional Chevrolet economy.

TRUCKS ENGINEERED FOR YOUR PAYLOADS! Chevrolet trucks are designed for the job they will do—engineered from tires to axle, springs, clutch and power plant to do that job with the greatest efficiency and lowest cost. You don't waste money on too heavy a truck or too light a truck. You buy the *right* truck for *your* job!

MORE STAMINA! More strength where strength counts most! In 1953, all Chevrolet trucks have stronger, brawnier, more rigid frames. They have heavier, sturdier construction that means a longer, lower-cost life for your truck. And they have new larger, safer, longer lasting brakes on many models, too!

GREAT TRUCK FEATURES! In addition to the many *NEW* things you'll find in these 1953 Chevrolet trucks, you'll also find many great features yet unmatched by other makes of trucks. Features such as Flexi-Mounted Cabs, Unit-Designed Bodies, Ball-Gear Steering and many others help make Chevrolet Advance-Design trucks your greatest buy. Chevrolet Division of General Motors, Detroit 2, Michigan.

CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—the Loadmaster or the Thriftmaster—to give you greater power per gallon, lower cost per load. **POWER-JET CARBURETOR**—for smooth, quick acceleration response. **DIAPHRAGM SPRING CLUTCH**—for easy-action engagement. **SYNCHRO-MESH TRANSMISSION**—for fast, smooth shifting. **HYPOID REAR AXLE**—for dependability and long life. **TORQUE-ACTION BRAKES**—on light-duty and medium-duty models and on front of heavy-duty models. **TWIN-ACTION REAR BRAKES**—on heavy-duty models. **DUAL-SHOE PARKING BRAKE**—for greater holding ability on heavy-duty models. **CAB SEAT**—with double deck springs for complete riding comfort. **VENTI-PANES**—for improved cab ventilation. **WIDE-BASE WHEELS**—for increased tire mileage. **BALL-GEAR STEERING**—for easier handling. **UNIT-DESIGNED BODIES**—for greater load protection. **ADVANCE-DESIGN STYLING**—for increased comfort and modern appearance.

CHEVROLET

first in demand in value in sales

Recommended Electrical Insulation . . .

What to Use and Where to Use It

By C. J. PHOTIADIS
Motor Engineering Dept.
Westinghouse Electric Corp.
Buffalo, N. Y.

MECHANICAL STRENGTH, dielectric strength and insulation strength are basic properties to be considered in selecting any insulating material or varnish.

The first consideration for all insulation is its mechanical strength. On this property rests the true electrical protection received when the insulation is in place. The resultant electrical protection obtained in the finished unit is more important than the characteristics of the material before shop handling. Further, the shop must be able to handle the insulation material effectively.

Dielectric strength and insulation resistance are other fundamental electrical requirements. Minimum permissible voltage insulation is two times rated voltage plus one thousand. Insulation resistance should be in the order of thousands of megohms since humidity and foreign material have a detrimental effect.

In selecting any insulation material the following should be considered:

1. **Effect of moisture on the material.**
2. **Effect of acids, alkalies and solvents.**
3. **Resistance to abrasion.**
4. **Effect of heat on the mechanical and electrical properties.**

Insulation standards established by NEMA are classed as "A"—for motors and generators with a permissible hot spot of 105 C or 216 F; "B"—for motors and generators with a permissible hot spot of 130 C or 266 F and "H"—silicone insulated, for motors with a permissible hot spot of 180 C or 356 F.

Have you been confused by the various types of electrical insulation specified for motors and generators? Many others also have been curious as to the difference between "A", "B" and "H" insulation. Following is a summary to help you to get acquainted with the uses and limitations of each type.

CLASS "A" INSULATION

Standards developed by NEMA for motors and generators which may develop a permissible hot spot of 105 C or 216 F are indicated in the following tabulation.

CLASS "B" INSULATION

Basically, Class "B" insulations follow very closely the Class "A" pattern. Treated glass or asbestos cloth, tapes, tying cords; glass or asbestos-laminated materials; and glass and mica, or asbestos and mica, are needed where such items are used in construction.

Abstracted from an article in *Maintenance News*, published by the Westinghouse Electric Corp.

Asbestos or glass-covered varnished cambric are accepted cable insulation. Varnish-treated glass-covered wire is used for conductor insulation.

In general, when suitable glass material is available for an insulation job, it is preferable because of its mechanical and abrasive-resisting qualities. Glass materials also provide better electrical and moisture protection and in many cases are cheaper than asbestos equivalents.

CLASS "H" INSULATION

Class "H" insulation is recommended for machines working under high ambient temperature conditions and where they may be subjected to frequent severe overloads which will result in high coil temperatures. In addition the excellent moisture-resistant qualities of the silicones

(*Continued on page 118*)

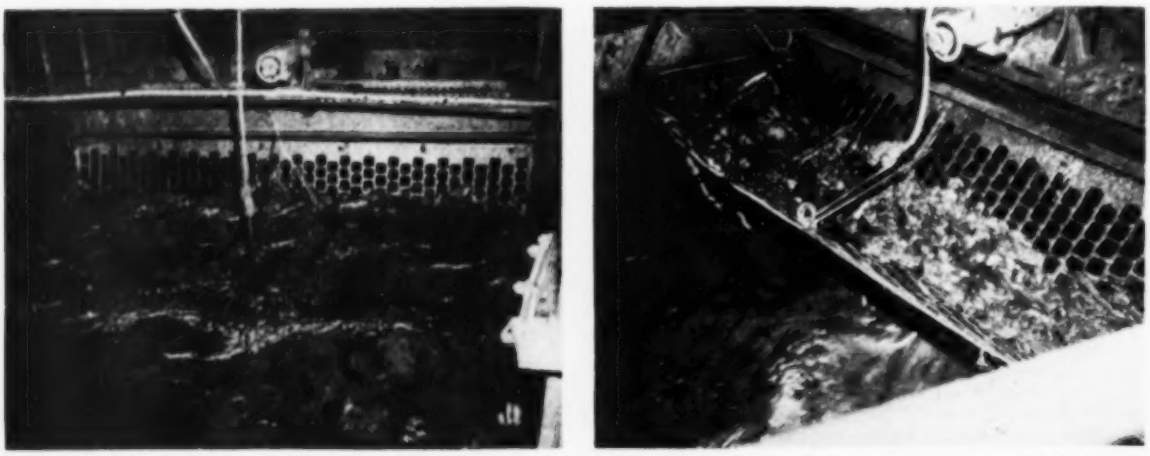
Application	Material
Slot cells, partially closed AC stators, some DC units	Fish paper, 0.015 to 0.025 in thick, laminated with treated cloth
Slot fillers, slot liners, magnet coil insulation	Fish paper or rag paper
Open-slot AC stators and most DC machines	Combined fish paper and mica wrapped on slot portion of the coil
Binding material	Closely woven cotton tape, a good fishline tying cord, adhesive paper tape
Phase pieces, layer insulation and coil paddings	Varnish-treated fabric
Field coils, diamonds of armature and rotor coils where greater voltage protection is necessary	Paper-mica and cloth-mica tapes
Lead protection in motors, generators, welders	Treated glass sleeving
Lead protection, transformers	Vinyl plastic
Slot fillers, collar bands, transformer coil tubes, coil washers, end punchings	Fullerboard
Wedge material in DC armatures and AC rotors	Hardfiber
Terminal boards, lead supports, wedges, washers, etc.	Treated laminated paper and Micarta plate
Insulating cores for DC armature and field coils and welding reactor coils	Rolled treated paper or cloth tubes
Commutator segments	Shellac-bonded mica plate, fully impregnated and molded asbestos laminate
Grid resistor assemblies	Commutator mica "V" rings, virgin mica washers
Layer and ground insulation for transformer coils	Crimped kraft paper, creped kraft paper and fullerboard
Wire	Synthetic enameled copper wire or double cotton-covered ribbon
Cables	Rubber-coated cotton-wrapped, extruded synthetic rubber-coated cables

recommend them for use in extreme moisture conditions.

Reduction in frame size of units is sometimes possible with silicone insulation since it permits a small machine having high losses to run at temperatures exceeding the limits of Class "A" or "B" materials.

Fundamentally, the silicone insulating materials are the same as those discussed under Class "B" materials except for silicone varnish—that is, silicone-treated glass cloths, tapes, tying cords, silicone-impregnated glass laminates, and silicone-treated glass cloth-mica combinations using a silicone-mica bond. Silicone impregnating and dipping varnishes are used exclusively on this type of equipment. Silicone-treated glass-covered wire is the conductor insulation.

When compared with conventional varnishes, silicone dipping and impregnating varnishes at present need a more involved baking schedule and higher temperatures to obtain optimum results. They require step-wise increase in treating temperatures, coupled with a bake of at least 4 hr at 200 C or 392 F to obtain a satisfactory result. If the equipment will not operate higher than 150 C or 302 F it may be adequate to process the silicone-varnish treated machines at usual thermoset baking temperatures.



SCREEN BASKET across wash-box discharge in normal position for skimming off tramp wood (left) and in raised position for cleaning out the catch (right).

Wash Box Skimmer Stops Tramp Wood

TRAMP WOOD, consisting mostly of pieces of cap boards, presented the Black Star Coal Corp. with a problem for some time after its new washing and drying plant at Alva, Harlan County, Ky., went into service (see p 102). Design and installation of a skimming basket across the discharge end of the wash box solved the difficulty.

The basket is made from 2-in square-hole screen plate bent to a curve and so positioned that its front edge is submerged about 3 in below the surface. It is hinged to the structure at the back and on the front has a hook, from which a rope extends over a pulley to permit its being raised for cleaning out.

To remove the wood, the jig operator, working from a standing position, uses a long stick with a sharp nail on the end, spearing the pieces and piling them on the floor for disposal through a window to a pile outside the plant. Cleaning the basket once a shift usually is sufficient.

Guiding Trucks to the Loading Shovel

DO YOUR TRUCK DRIVERS, not knowing how far or fast the loading shovel has advanced in the pit, sometimes pass up a newly-designated turn-off down the incline to the pit and tool on down the main haulage road? Or, before reaching a new incline road, do they turn off the main road onto an incline road that the shovel has passed?

In either event, your mistaken driver has to back up, turn around and search out the correct pit entrance. That means lost time for the truck, lost time for the shovel, wasted motor fuel and an annoyed pit boss.

Bevier Coal Co., Macon, Mo., where Howard S. Frisbie is superintendent, avoids such mistakes with the movable guidepost shown in the accompanying photograph. Standing some 6 ft high and made of steel, the guidepost can be moved easily from one pit entrance to the next and thrust into the ground like a javelin. There it is clearly visible to drivers approaching the turn-off, who know by the cut-out figures in the steel-plate arrow where the 480 shovel is.

It'll be back for another

BIG LOAD...*FAST!*

For big production around a mine, you can't beat this Caterpillar DW20 Tractor with No. 20 Scraper. Every inch of it is designed for stripping and hauling big loads on the double. It has a travel speed of 26.6 m.p.h., a capacity of 20 cu. yds. heaped and 15 struck, and plenty of power – 225 HP at the drawbar.

Considering its heft, this rugged unit is extremely agile and easy to handle. Feature after feature contributes to its ability to make fast round trips. For instance, bowl and cutting blade load materials quickly with a "boiling" action, inward and upward through the center of the mass. Its large tires have good flotation for going in tough conditions. Its high apron lift clears the stickiest overburden with positive, forward ejection. And its turning area is 35 ft. – an asset wherever you're working!

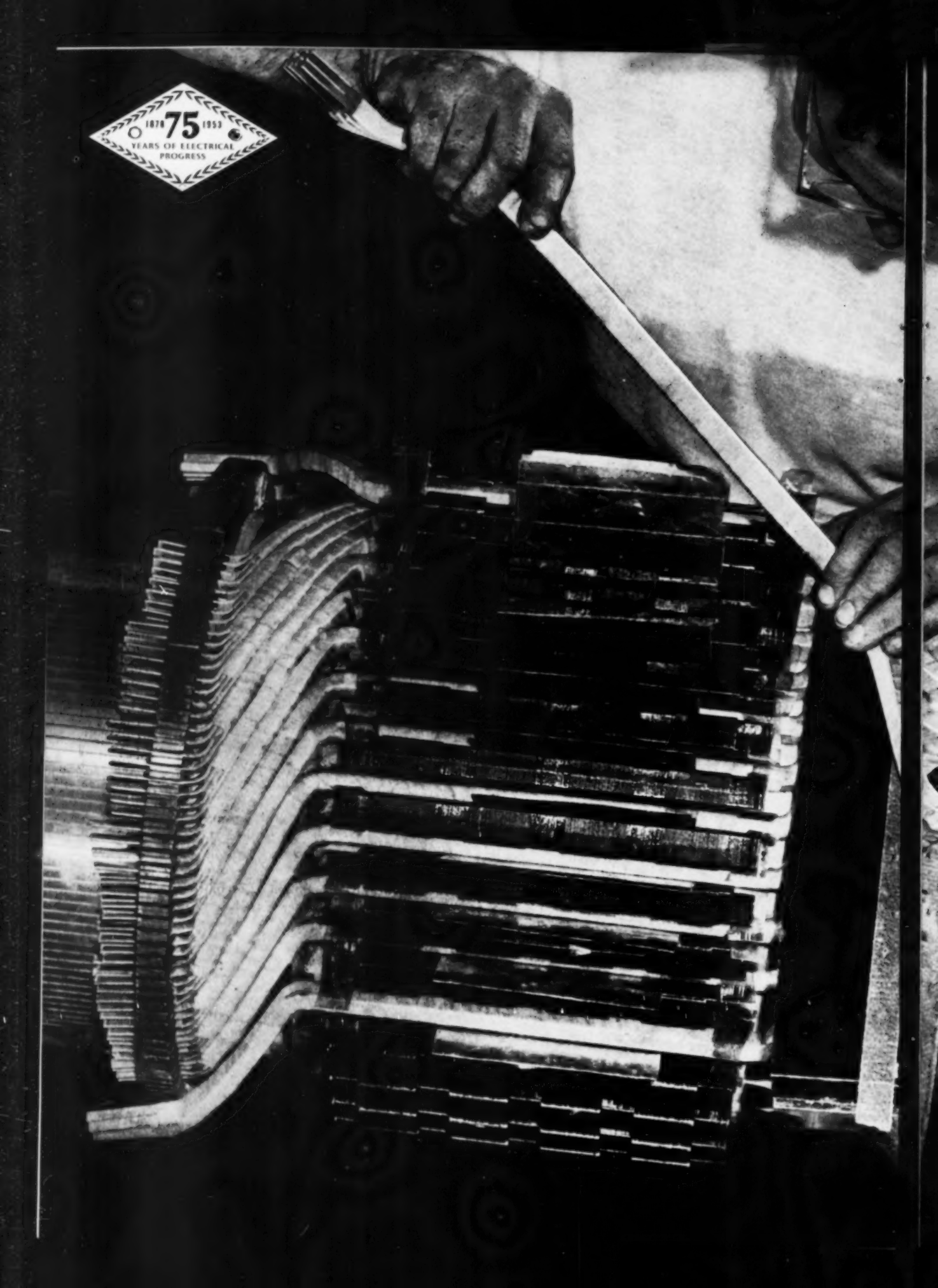
Like all Caterpillar equipment, the DW20-No. 20 rig is built to stay on the job and out of the shop. You'll find it can take a terrific beating without whimpering. Of course, normal maintenance and the use of genuine Caterpillar parts, when needed, will lengthen its life span. Your Caterpillar Dealer is a convenient source of service and information. Let him show you how this husky yellow scraper is delivering big yardage at low cost in mines around the country. He'll also be glad to arrange a demonstration.

CATERPILLAR, PEORIA, ILLINOIS

CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL ENGINES
TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

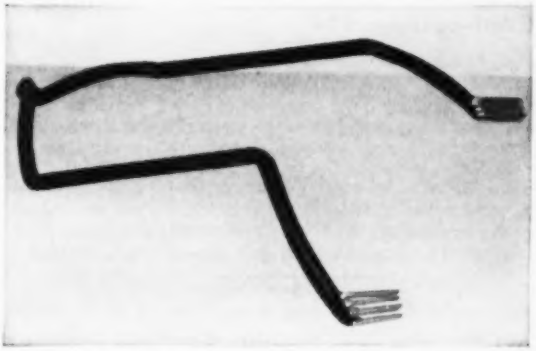

1878 75 1953
YEARS OF ELECTRICAL PROGRESS

You build long life into G-E traction motors by always using genuine replacement coils

You can realize important savings in rewind costs by always using genuine General Electric replacement coils for your G-E mine locomotive traction motors. They're easy to wind and last longer, because they withstand high operating temperatures and stay tight in the core slots.

Each G-E coil is dimensionally accurate. And, through G.E.'s continuing research program, you get the correct insulation and proper varnish treatment for the job.

To get top performance—"original equipment" performance—from your G-E mine locomotives, always specify ***genuine*** G-E armature and field coils for your rotating equipment. They're the best you can buy for your G-E mine locomotives. For full pricing and product information, contact your nearest G-E Apparatus Sales office. General Electric Co., Schenectady 5, N. Y. 128-12



INSULATION'S THE KEY TO LONG COIL LIFE
Because insulation largely determines coil life, G-E coils (like HM-843 armature coil, above) use high-temperature tapes, such as glass and mica, suited for specific job, and inner and outer coats of proper varnish to help prevent deterioration. Coils fit accurately and snugly to speed heat dissipation.

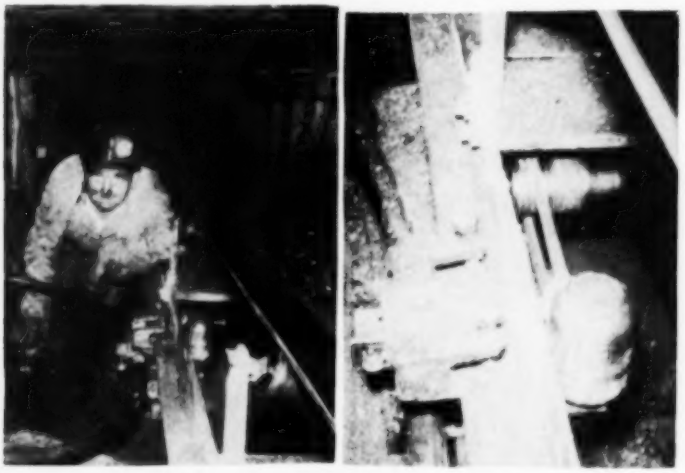
You can put your confidence in—

GENERAL ELECTRIC

Equipment News

New Permissible Dust Collector For Roof-Bolting (1)

The USBM has tested and approved the new electrically driven "MSA Bolt Hole Cleaner" designed for collecting dusts produced in rock drilling in coal mines, and one rotary roof-drill manufacturer has already concluded arrangements with MSA to install the units on all its roof-bolting drills as standard equipment, the company reports. In addition to the electrically driven assembly with a 1-hp explosion-tested motor and control, a mechanically driven unit has been designed for permanent mounting on either electric rotary drills or compressors, as well as two compressed-air-power assemblies, one using 22 cfm and operating 25 ft of collecting hose and a second using 65 cfm with 200 ft of hose. The self-contained electric-driven assembly is shown in the inset above. Circle 1 on the postage-free card facing p 132 for Bulletin 1504-1 with full details from Mine Safety Appliances Co., Pittsburgh 8.



Belt-Powered Portable Gathering Pump Requires No Electric Motor (2)

New Harris-Frye Model 17 mine pump is a small-size motorless gathering pump designed primarily for use in belt-conveyor mines and for dewatering small swags usually neglected because of difficulties of hooking-up a conventional pump. Without electrical hook-ups, electrical hazards are eliminated and total weight of pump and belt-frame attachment is 27 lb. The pump is self-priming and its design insures low maintenance, the maker says. Complete cost of the pump and attachment ready to install is $80. Photos above show a Model 17 installed, drawing about ½ hp from a belt return idler and delivering approximately 300 gph at 20-lb head through 1-in plastic hose. Circle 2 on postage-free card for bulletin and other details from Harris Pump & Supply Co., Pittsburgh, Pa., and Charleston, W. Va.

Fleet of 47-Ton Coal Haulers Built for Georgetown Stripping (3)

A fleet of 10 Euclid 47-ton-capacity coal haulers, built of special high-strength alloy steel, has been delivered to the Hanna Coal Co., Div. of Pittsburgh Consolidation Coal Co., for use at its Georgetown strip mine, Cadiz, Ohio. The largest ever built by Euclid, the units have tractors powered by 350-hp diesel engines and trailers made of a special manganese-nickel-copper alloy steel noted for its high tensile strength and resistance to abrasion. Payload capacity is 62 yd, struck, or 70 yd, heaped, and the units are 52 ft 5 in long. Other unusual features include spring mounting of trailer and nylon cord tires of 28-ply rating. More details from Euclid Road Machinery Co., Cleveland 17.

Kennametal Bits
Cut 10 times more places per bit life

at Vinton Coal and Coke Co.

POWER SAVED
Use of Kennametal Cutter Bits has reduced power consumption by as much as 30% to 50% in typical Penna. and W.Va. mines. The comparisons were made using either tong-testers or watt-hour meters.

BITS STAY SHARP LONGER
The Kennametal Bit illustrated is typical of a set that cut 100 places (Winifred Seam, W.Va.) before being sharpened. Bits were still capable of cutting several hundred more places.

The severe cutting conditions at Vinton Coal and Coke Co. had often made bit changing necessary after each place cut. Bits had to be discarded after cutting a maximum of only 10 places.

The company decided to change to Kennametal to increase their tonnage per shift. They have found that Kennametal U-1 Bits give them greater production, as expected, by cutting 100 places to the other bits' 10. Important *additional* savings in time, power output, and bit sharpening costs were also effected. *Overall savings,* mine executives estimate, *amount to 5¢ per ton.*

Kennametal Bits give outstanding service because of their practical, proven design, and because their tough, Kennametal tips have shock and wear-resistant qualities equalled by no other tungsten-carbide in the coal industry. Your Kennametal representative —a veteran mining man—will gladly go into your mine to demonstrate and prove how these Kennametal advantages can reduce *your* cutting or drilling costs. Get in touch with him today!

Kennametal Inc., Mining Tool Div., Bedford, Pa.

KENNAMETAL®

Quality Carbide Of The Coal Industry

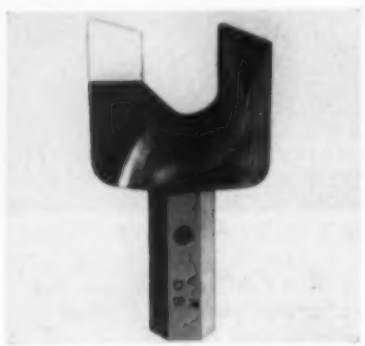
World's Largest Manufacturer of Tungsten-Carbide Mining Tools

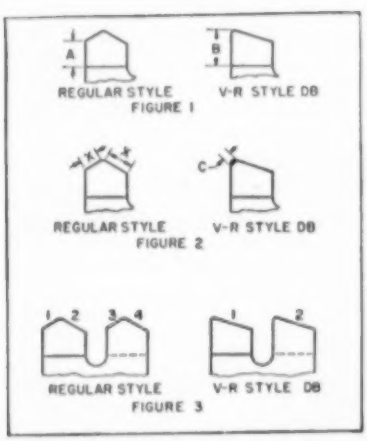
Loaders Have 4-Wheel Drive and Steer (4)

Two new 4-wheel planetary-drive, 4-wheel power-steered front-end loaders, the Scoopmobile Models LD5 and LD10, have capacities up to 1 and 2 cu yd, respectively. Design permits retaining full power on all four wheels in any degree of turning radius, and the hydraulically operated bucket has exceptional break-out for better and faster loading, with hinged coupling steering facilitating lateral spotting of bucket, the maker says. The units have eight speeds forward and back, with diesel power available at extra cost. Details from Mixermobile Manufacturers, Portland, Ore.

High-Yardage Dozer Uses 96-In Blade (5)

New Baker 15X "no pushbeam" bulldozer, developed in cooperation with Allis-Chalmers, mounts on the A-C HD-15 tractors and features integral tractor-dozer construction; a 96-in blade for legal highway portability without permits; a 51-in-high moldboard; 39½-in blade rise and 15½-in drop below ground; greater track oscillation; center of gravity permitting drawbar work with dozer mounted; operator ease; and simplified servicing. Savings of some 1,400 lb of steel through simplified design permits lower cost than comparable units, the maker says. Full data from Baker Mfg. Co., Springfield, Ill.





MORE LIFE FROM AUGERS (6)

"Three times longer life between grinds" is the report from users, according to the Vascoloy-Ramet Corp., in announcing its new Style DB carbide-tipped auger drill head for both post-mounted and hand-held drilling. Style DB departs in tip design from the ordinary-type auger heads in the following respects, the manufacturer states: By providing larger Area B (Fig. 1), the DB bit gives double the tool life as compared with Area A of the regular-type bit. Other drills keep the entire Area X (Fig. 2) in contact when drilling, increasing load and fines, while the DB has only the small Area C in contact, which gives easier, faster feeding. Since Style DB has only two surfaces to grind (Fig. 3), wheel costs are reduced 50%. Users also report 60% coarser cuttings, the maker says. Style DB is available from 1⅝ to 3 in in diameter with either standard hexagon or square shanks. More details from Vascoloy-Ramet Corp., Waukegan, Ill.

UNITS BOOST AC VOLTAGE (7)

New Celab Voltage Booster will add voltage to AC lines up to 10% manually, and then add 10% more automatically as needed to maintain the desired voltage at the load end of the line when placed anywhere in the line, the maker says. Celab boosters will not distort either the phase or wave form, and are unaffected by the system power factor. They are made in portable or stationary types, horizontal or vertical, for indoor, outdoor or underground use, in sizes from 50 to 500 kva for 240-, 480- and 2,400-v 3-phase power lines. Bulletin 125 with all details on 17 different sizes offered by Clark Electronic Laboratories, Palm Springs, Calif.

RUBBER-TIRED TRACTORS GET CRAWLER POWER (8)

With easily installed Vise-Grip lugs, it is now possible for a rubber-tired tractor to efficiently operate in mud, snow, ice, sand, etc., and by reducing power spinning, save on fuel consumption and motor wear, the maker says. A framework supporting the lugs bolts on the outside of the tractor wheel, using the same bolts for the tractor wheel and tire. Under adverse ground conditions, the lugs are extended beyond the width of the tractor tire and when conditions improve or traveling on a hard-surfaced road, the lugs can be retracted. It requires only 4

B.F.Goodrich

How tires that carry 50-ton loads give coal stripper 50% saving

J. Robert Bazley, Inc. strips coal on some of the roughest terrain in the Pennsylvania anthracite region. This Pottsville firm operates 35 shovels, 19 bulldozers, 12 drills and 177 other units, including scrapers, truck cranes and heavy-duty trucks.

A pioneer in the use of trucks to haul coal from the pits, this company once worked a project so extensive it required the largest available equipment plus the design of new units.

Nearly 300 B. F. Goodrich off-the-road tires carry the Bazley equipment over rough rock and cinder-filled roads, up some of the steepest grades in the area. The Universal tires pictured above, for example, just hauled 50 tons —30 tons of coal and the truck weight of 20 tons—to the top of #4 colliery.

Under such difficult service conditions these tires will be recapped to give an additional 75% of new-tire performance. Some tires will even be recapped twice. No wonder this firm saves as much as 50% with recapped B. F. Goodrich tires.

B. F. Goodrich off-the-road tires give such superior service because of the patented nylon shock shield. Layers of strong, elastic nylon cords built under the tread rubber absorb shock and impact, actually protect the tire body. You save 4 ways: (1) more recappable tires and more miles per recap (2) increased tire mileage (3) greater bruise resistance (4) less danger of tread separation.

All these savings, yet the exclusive nylon shock shield costs nothing extra. Found in all BFG off-the-road tires of 8 or more plies. *Double* shock shield in larger sizes.

For details on the complete line of B. F. Goodrich off-the-road tires that cut your costs, see your local dealer. He's listed under Tires in the Yellow Pages of your telephone book. Or write: *The B. F. Goodrich Company, Akron, Ohio.*

RESEARCH KEEPS
B.F.Goodrich
FIRST IN RUBBER

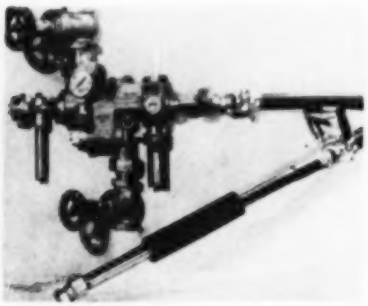
min and a wrench to extend or retract the lugs. Further information from COMCO, Kilgore, Tex.

PLASTIC CLOTH SUGGESTED FOR BRATTICE USE (9)

New industrial fabric called Fortron, featuring characteristics that make it potentially useful for brattice and other mining uses, the company says, is constructed of two sheets of vinyl film and a center layer of Fiberglas fabric laminated together under heat and pressure to form a single sheet. According to the maker, Fortron is strong, lightweight, and nonabsorbent; is mildew- and fungi-proof; acid-, grease- and flame-resistant; and will neither stretch, shrink, nor crack at temperatures as low as minus 30 F. Electronic sealing makes possible the production of air- and water-tight sheets of Fortron of any size and is available in both colored and clear translucent types. Full data from Thermoplastic Plastics Corp., 1457 Broadway, New York.

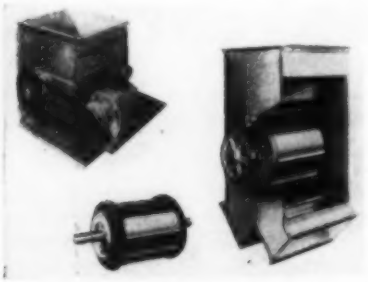
MOTOR-OPERATED RHEOSTAT (10)

New Westinghouse Type RK motor-operated field rheostat, used to adjust speed of DC motors up to 200 hp and voltage of generators up to 300 kw, has two cam-operated snap-action limit switches, with additional switches available for auxiliary circuits. Each cam is adjustable over a 360-deg range from the front of the rheostat, and is available for 15-, 45-, and 90-deg travel. Two different gear ratios can be supplied, and the travel time can be adjusted over a 3:1 range by inserting resistance in the motor circuit. The rheostats are designed for ease of installation and maintenance, and all components are readily accessible for inspection or adjustment, it is said. Details from Westinghouse Electric Corp., Pittsburgh 30.



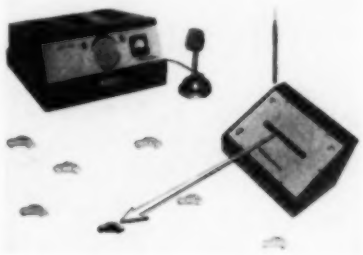
LOW-PRESSURE STEAM BOOSTED FOR MACHINE CLEANING (11)

The Sellers booster jet now makes available to plants with low-pressure steam facilities the advantages of hydraulic-jet cleaning, providing a solid jet of high-pressure hot water and detergent for all heavy-duty cleaning, the maker says. Designed to operate on ordinary cold water and plant steam of from 5 to 25 psi, the unit converts 5-psi inlet steam pressure to 100-psi discharge pressure, with proportionate increases up to 200-psi discharge pressure with 25-psi inlet steam. Requiring no fuel or electricity, the Sellers booster jet will operate a solid stream of hot water, containing detergent up to 25% of the total volume, with temperatures of 160 to 210 F and pressures of 100 to 200 psi, up to 30 ft from the discharge nozzle. Details from Sellers Injector Corp., Philadelphia 30.



MAGNETIC DRUMS (12)

Improvements and modifications designed to increase efficiency made on all Eriez permanent magnetic drums include changeable sheave sizes for various operating speeds; stainless-steel shells that resist pitting and corrosion; dusttight construction; lightweight, rigid, cast-aluminum sides; adjustable feeder assemblies; smooth running and oil-sealed bearings; and extended discharge ducts. The magnetic drum is available in two new models complete with motor, with or without housing: Model DF-101 designed to provide highest efficiency in drum separation, operating as a feeding device as well as a magnetic separator; and Model DF-102 drum for effective handling of numerous separation problems, usually installed at the discharge of an open or closed chute, spout or screw conveyor. Bulletin No. B-601 with full information from Eriez Mfg. Co., Erie, Pa.



SELECTIVE SIGNALING (13)

Newly designed for use with any communication medium—two-way radio, land lines, microwave or power line carrier, and anywhere that remote control or receiver selection is a necessity—this selective system functions to permit any operator to initiate an operation at one or more remote points through an intervening communication medium. The operation may be the selection of a particular receiver or group of receivers from many receivers in a system, the selection of a particular relay transmitter, energizing of a lamp or alarm or any operation that can be remotely controlled by a relay. Operating and application details from Motorola, Inc., Chicago 51.

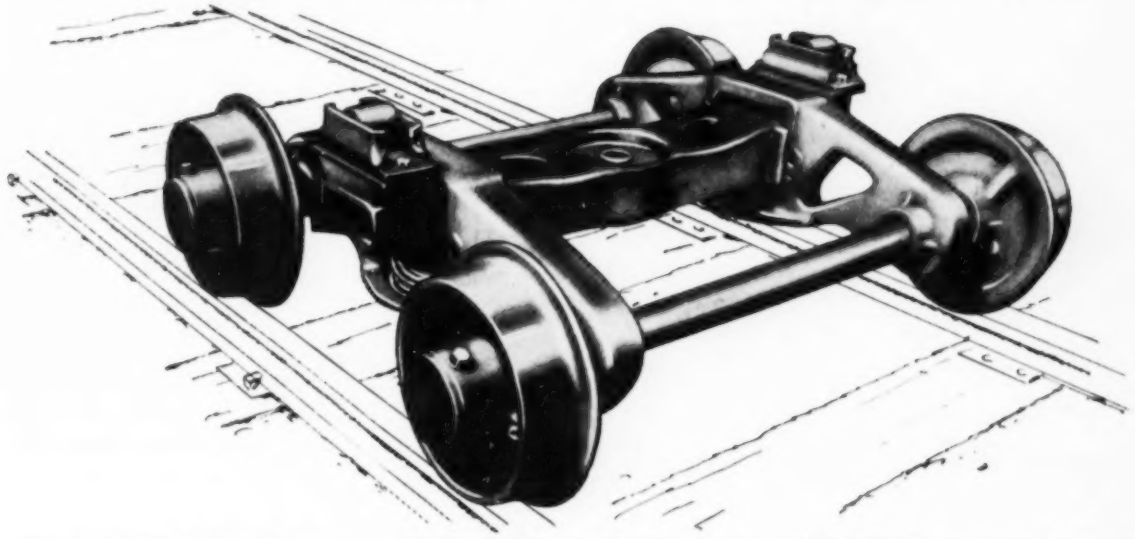
20-YARD TRAILER DUMP (14)

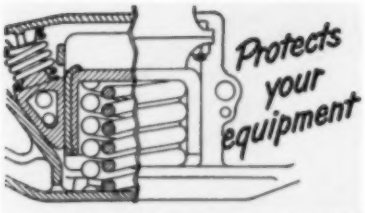
New 20-ft long, 20-cu-yd-capacity package trailer dump, known as Galion heavy-duty Model 12, has a body with 16-yd sides and 20-yd ends with a semi-bay front. Dumping is handled by a Galion Model 77380 hoist rated at 22 tons. The tandem-axle trailer has a specially designed heavy-duty dump trailer suspension and is available with either hose operation or power fifth wheel, as desired. Data from Galion All-steel Body Co., Galion, Ohio.

SMALL-SIZED PUMPS (15)

A line of Apco V-type close-coupled turbine-type pumps with mechanical seals is available in capacities 3 to 30 gpm and heads from 0 to 250 ft, with self-

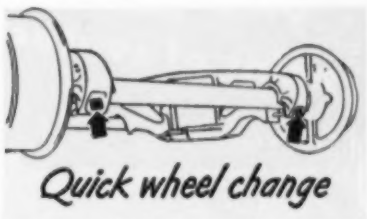
Specify NATIONAL NC-1 trucks for your large 8-wheel mine cars





Shock-absorbing system of the NC-1 truck is similar to designs of the American Association of Railroads for full-size freight car trucks. The oscillation control mechanism (see cutaway) floats your loads over the tracks.

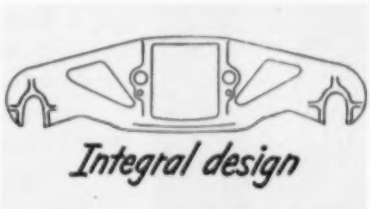
Track irregularities are no hindrance to higher speeds for mine cars when they are equipped with National NC-1 trucks. Truck design and large diameter, low stressed, load-carrying springs improve riding qualities.



Removal of bolt at each end of side frame permits quick wheel and axle assembly change. Cuts repair time and costs . . . keeps cars in operation longer. No lengthy tie-ups for wheel and axle changes on a National NC-1 truck.

The NC-1 truck stays square automatically. V-shaped slots over the axles make it impossible for the truck to get out of square without lifting entire weight of the car body and lading—means longer service, less repairs.

National NC-1 truck's large center bearing provides maximum wear life by reducing per-square-inch loading... provides bolster stability. Has easily replaceable centerplate shims and adequate provision for lubrication.



Side frame and bolster are each of one-piece, integrally cast construction similar to the National C-1 trucks used on railroads. Gives maximum strength, minimum weight—has *no welds or rivets to shake loose.* A-3920

For minimum maintenance time and spillage, plus maximum equipment protection—specify National NC-1 trucks on your next 8-wheel mine car order.

NATIONAL Products FOR TRANSPORTATION AND INDUSTRY Est. 1868

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Cleveland 6, Ohio

Willison Automatic Couplers • Friction & Rubber Draft Gears • Car Trucks • NACO Steel Wheels • NACO Steel Links & Swivel Hitchings

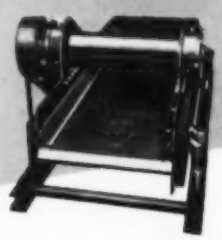
non-blinding Screens

. . . there is only one point – one fine point – of contact between top and tie rods in the exclusive BEE-ZEE round rod design. It offers no "pockets" for moisture and dust to collect. There's no blinding or clogging – even on the highest moisture materials. Think what this can mean in terms of smoother, more profitable screening operation!

only one fine point of contact . . . . . .

ROUND RODS LAST LONGER, TOO!

Round top rod screen openings change in size only after worn halfway through! Stainless steel rods will not rust or corrode...built-in screen tension means greater efficiency, easier installation. Small wonder, then, that coal operators report 10, 20 – even 30 times longer wear with BEE-ZEE Screens!

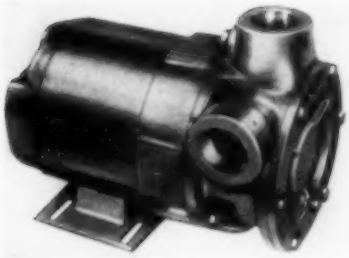


BEE-ZEE SCREENS CAN BE TAILORED TO YOUR NEEDS. SEND US YOUR REQUIREMENTS. ASK FOR FREE CATALOG. NO OBLIGATION.

BIXBY-ZIMMER Engineering Co.

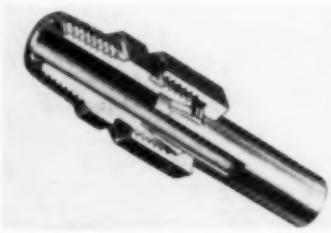
133 Abingdon Street, Galesburg, Illinois

BEE-ZEE SCREENS CAN BE FITTED TO ANY COAL PROCESSING EQUIPMENT

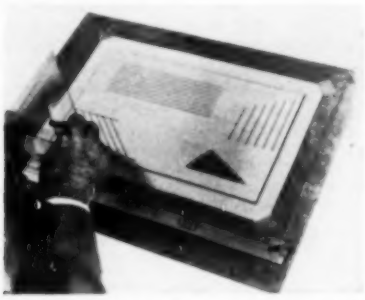


priming features where desired. The close-coupled design reduces the pump-motor assembly to small over-all size, and because pump and motor shaft are integral, coupling noise and misalignment troubles are avoided, the maker says. Four different positions for suction and discharge connections make for installation flexibility. The pumps have a suction lift of 28 ft (at sea level) and because of design will not vapor-bind. Details from Aurora Pump Co., Aurora, Ill.

Equipment Shorts



(16) TUBE FITTINGS—Ermeto patented tube fittings are said by the maker to provide a more positive seal than flared or compression-type fittings and yet require no flaring, threading, welding, or soldering, with installation without special preparation or special tools. Because of its leakproof features the Ermeto fitting is recommended for use wherever metal tubing is used for transferring liquids or gases and is regularly available in carbon and stainless steels, and in monel and brass on special order. Catalog E-1457 from The Weatherhead Co., Cleveland 8.



(17) PARALLELING DRAFTING BOARD features a new rubber desk grip on the back to provide the advantage of holding the board on any desk in a horizontal or angular position with-

mechanically stronger sheath

greater resistance to fire, heat, oil, chemicals

firm, rugged assembly

HAZACORD®

CHALLENGES YOUR COMPARISON FOR

Long life... Low cost service

corrosion resistant conductors

higher breakdown voltages

maximum flexibility and toughness

Hazacord invites your comparison . . . for it's comparison alone that lets you see how HAZACORD QUALITY cuts costs on any flexible cord or portable cable installation.

Every Hazacord is protected by Hazard's exclusive Hazaprene ZBF sheath which means extra resistance to oils, acids, chemicals, moisture, weather. And the Hazaprene sheath is *cured under pressure in a continuous metal mold*—the best method known to provide "tire-tread" toughness with "snake-like" flexibility.

Like the rugged sheath, every Hazacord component—conductor, insulation and filler—is designed and made with the same skill. And every Hazacord, whether for light shop duty or tough mining operations, is assembled with precision and doublechecked for safety and performance even above rated capacity.

Compare Hazacord for quality—it's your best guide to longer-lived flexible cords and portable cables that mean *real* economy. Complete information on Hazard Mining Cables for all uses is contained in the 72 page booklet H-433; write for your free copy today. Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pennsylvania.

EMBOSSED: Hazaprene ZBF P-104 EM
This embossing is positive proof of mold-curing.

HAZACORD *Mold-Cured* **portable cables**

GUYAN RESISTORS

Above is a typical design of all GUYAN RESISTORS including standard boxes and mining equipment resistors.

• • • •

STRATEGIC LOCATION OF GUYAN QUALIFIED DISTRIBUTORS TO COAL MINING INDUSTRY

Athens Armature & Machine Works, Athens, Ohio
Bluefield Hardware Company, Bluefield, W. Va.
Cambridge Machine & Supply Co., Cambridge, Ohio
Close Distributing Company, Pittsburgh, Pa.
W. M. Hales Company, Chicago & Danville, Ill.
H. A. Holden, Inc., Minneapolis, Minn.
Keith Brokerage, St. Johns, New Brunswick, CANADA
Kentucky Mine Supply Company, Harlan, Ky.
Carl Liem, Wilkes-Barre, Pa.
Mechanical Mining Service Co., Morgantown, W. Va.
Mill & Mine Supply Company, Birmingham, Ala.
Mine Service Co., Lothair, Ky.
R. M. Rogan, Middlesboro, Ky.
Service Supply Company, Wheeling, W. Va.
Union Supply Company, Denver, Colo.
Universal Supply Co., Beckley, W. Va.
Wetzel Equipment Co., Salt Lake City, Utah

GUYAN MACHINERY CO.
LOGAN · · · WEST VIRGINIA

out slipping. Design makes the T-square and most other drawing instruments unnecessary; for straightline, parallel and angular drawing no additional drawing equipment except a pencil and a triangle is needed. Made in three models up to 21 x 25 in, selling for $6.50, by Bradford Bailey Co., P. O. Box 440, Elizabeth, N. J.

(18) BUTTERFLY VALVE—Featuring speed and ease of operation, plus a unique design that permits use of any combination of interchangeable connections, the Keystone butterfly valve is recommended by the maker for use on liquid, sludge or dry material lines. The disk of the valve seals in a resilient, oil- and acid-resistant seat and will provide a complete shut-off against pressures up to 150 psi or vacuum. Valve design permits the entire sealing section to be removed for inspection, cleaning or replacement without disconnecting the line. Available in sizes from 2 through 12 in in various metals and end connections. Full data from Keystone Tool Corp., Houston, Tex.

(19) CONDUIT—Sealtite flexible electrical conduit, Type UA, is the first of its kind to gain Underwriters' Laboratories approval for use in wet locations, the maker says. The tough extruded synthetic covering over Sealtite Type UA's flexible metal core protects wiring against moisture, oil, dirt, chemicals and corrosive fumes on permanent and temporary installations. It can be cut to required lengths and bends easily, it is said. Details from American Brass Co., Waterbury, Conn.

(20) INDUSTRIAL HEATERS—Improved line of Westinghouse industrial heaters, which deliver large volumes of heated air for large areas which cannot be heated by more conventional methods, are self-contained units ranging from 100,000 to 2,500,000-Btu per hour in heating capacity, and from 2,000 to 25,000 cfm in air velocity. They may be floor, wall or ceiling mounted, and in either upright or inverted position when wall-mounted. Further information from Westinghouse Sturtevant Div., Hyde Park, Boston 36.

(21) PORTABLE AIR COMPRESSOR—Hornet 75, a 75-cfm single-stage gasoline-powered compressor, was developed as a

medium-size compressor that can be handled by one man and is economical to build and operate, the maker says. Weighing only 1,280 lb and mounted on a 3-wheel trailer, the unit can be towed at high speed behind a passenger car. It uses a 6-cylinder Chrysler engine rebuilt for compression service. Data from O. I. Clutch & Machinery Co., Columbia, Pa.

(22) ELECTRIC DRILL—New Thor ¼-in Copper Line electric drill, featuring pistol-grip operation, is said by the maker to be low-priced, small, lightweight and streamlined for fast, easy operation, yet powerful and sturdily built for long, heavy use. It weighs 2¾ lb, measures only 7⅝ in in length and is furnished with either geared or keyless chuck as specified. Independent Pneumatic Tool Co., Aurora, Ill.

(23) AIR COMPRESSOR—"Auto-Air" compressor assembly suitable for mounting on standard panel-type trucks, known as Model 105-VBA, delivers 105 cfm at 100-lb pressure. It is driven directly from the truck engine through a Davey P-80 heavy-duty power take-off and occupies only one-third of truck body, leaving the remainder open for the transportation of men, tools and materials. Details from Davey Compressor Co., Kent, Ohio.

(24) FLASHING BULLETIN BOARD bringing life to safety posters operates on a 40-w lamp and flashing unit that flashes approximately 15 times a minute. The two double glass panels take two separate messages that may be read from a wide angle. The board accommodates National Safety Council posters and other sheets up to 8½ x 11½ in and is finished in bright green enamel. Details from Industrial Products Co., Philadelphia 33.

(25) SAFETY GOGGLES and spectacles in New Pulmosan line are said by the maker to meet strictest safety specifications and include types for all eye hazards met in industry. Catalog covering safety goggles, spectacles and face shields for chipping, grinding, impact, welding, dusts and chemicals available from Pulmosan Safety Equipment Corp., Brooklyn 17, N. Y.

EQUIPMENT BULLETINS AVAILABLE

(26) FOR SHOVEL OWNERS and operators, a series of eight articles on the "Use and Application of Power Cranes and Shovels" has been compiled in a 32-p booklet available from the Koehring Co., Milwaukee 16, Wis. Originally written by E. O. Martinson, Koehring vice president in charge of engineering, the articles discuss in detail the basic principles of power-shovel and crane

Cold Test

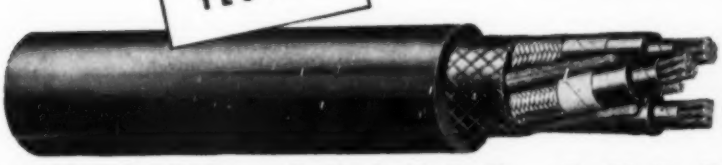
Exposure to sub-Arctic temperature is one of the ordeals these cables must undergo to prove their qualifications. The cables are conditioned for one week at -70° F. and, while at this temperature, bent around a mandrel having a diameter three times that of the cable for cables .55" and less in diameter. Larger cables are bent to greater diameters. This is one of the most severe ways of testing U. S. Royals.

U. S. ROYAL CABLES ARE COLD RESISTANT

7 reasons why U. S. Royal Cables mean safety:

Seven grueling laboratory tests, each of them tougher than actual conditions, guarantee U. S. Royal's resistance to moisture, abrasion, cutting, heat, cold, impact, flexing. United States Rubber engineers spare no effort in making sure U. S. Royal is a completely safe electrical cable. Write for your free copy of valuable booklet on mining cables to address below.

SAFETY TESTED



U. S. Royal Shielded Portable Cable Type SH-D

Products of U.S. RUBBER SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

ELECTRICAL WIRE AND CABLE DEPARTMENT • ROCKEFELLER CENTER, NEW YORK 20, NEW YORK

Beside the tipple stands a powerful small shed

Peer closely at the shed and you'll see the power behind this slope coal mine near Peoria, Ill. A Caterpillar D315 Diesel Engine is at work driving the 80 KVA generator that keeps the mine producing 175 tons of coal daily.

The mine, operated by the Zaborac Coal Co., slopes to a depth of 75 feet. Cutter, loader, hoist, locomotive and lighting system all draw steady power from the Caterpillar-driven generator.

In these days of spiraling costs, it's bedrock common sense to use cost-cutting Caterpillar power plants. They are a three-way hedge against inflation.

First, they have a long, productive life engineered into them. Translated into dollars, that means you have no costly down time with Caterpillar Diesels.

Second, they operate on low-cost No. 2 furnace oil — and they run smoothly without fouling! In terms of money, that means you can save on fuel costs, like the Zaborac mine which operates the D315 for only 52 cents an hour!

And, finally, with a Cat Diesel, you get the quick, efficient service for which Caterpillar Dealers are known — even in remote areas.

Get these profit-building engines on your team. You can *specify* Cat power in the mining equipment you buy. Caterpillar Diesel Engines are available in machines built by leading equipment manufacturers.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

CATERPILLAR

REG. U. S. PAT. OFF.

Diesel Engines
Electric Sets

USE THIS CARD

operation, capabilities of various excavator and crane attachments and prescribed requirements for their most efficient operation. The details involved in proper selection of this equipment for ordinary operating situations also are covered, as well as safety considerations and operating costs.

(27) **SHUTTLE-CAR BRAKE**—Booklet on the Goodyear airplane-type disk brake for industrial uses lists the advantages of employing single-disk brakes and shows their application on a shuttle car, loading machine, etc. Varying in diameter from 8 to 72 in, Goodyear disk brakes can be adapted to almost any machine, can be operated hydraulically, mechanically or pneumatically, or can be spring-set, solenoid-released. Booklet, "Industrial Disc Brakes by Goodyear," offered by Industrial Brake Dept., Aviation Products Div., Goodyear Tire & Rubber Co., Inc., Akron 16, Ohio.

(28) **"INDUSTRIAL POWER DISTRIBUTION IDEA BOOK,"** a helpful guide for engineers and electrical men on practices in large and small plants, is offered by the General Electric Co., Schenectady 5, N. Y. The new 28-p Booklet GEA-5900 covers utility distribution practices; methods of buying electric power; what to do when a choice of primary voltages is available; application of primary switches and circuit breakers; types and arrangements of primary cables; and types of load-center distribution systems. Other subjects discussed include use of branchfeeder switches, starters and fuses; grounding; combined power and lighting; how to calculate interrupting capacity, apply capacitors, and obtain economical direct current.

(29) **LOW-COAL LOADER**—Catalog CLT-524 from the Goodman Mfg. Co., Chicago 9, provides detailed information on the operation and application of the Goodman Type 865 Swing-Motion loading machine. Designed for trackless mining in low coal the unit features a capacity of 8 tpm and an over-all height of 26½ in.

(30) **WHEN AND HOW TO SHARPEN** tungsten-carbide mining tools, equipment required and best techniques to follow is included in a new 26-p catalog and maintenance instruction manual now available from Carboloy Dept. of General Electric Co., Detroit 32. Manual CM-110 covers tungsten-carbide roof-bolting drills, cutter, finger and auger drill bits and recommended grinding wheels to use, plus details on the company's manufacturing and research facilities, field service and customer-training school.

(31) **SCREW CONVEYORS**—For engineers, designers and others who can use comprehensive information on screw conveyors and screw feeders, a new 92-p Book 2280 is available from the Link-Belt Co., Chicago 1. The book gives detailed engineering information, with selection tables and horsepower formulas, layouts and arrangements, dimensional data and parts numbers, to permit selection of screw conveyors and screw feeders for many types of applications, including conveying, elevating, heating, cooling, mixing and many specialized applications. Engineering data and component specifications in a 54-p section present many practical suggestions for correct selection and arrangement of components.

(32) **CONVEYOR BELTS**—New 16-p catalog describing its new line of 12 Caricoal conveyor belts, offered by the B. F. Goodrich Co., Akron, Ohio, includes a 3-p section of engineering data featuring a four-step procedure for the proper selection of coal belts, together with a unit tension table; a table based on speed and motor requirements; and a table from which belt selection can be made from rate of loading, belt speed and motor horsepower. Four pages are devoted to maintenance and installation tips which help get longer life from belts.

(33) **WIRE-ROPE SLING HANDBOOK**—New 64-p pocket-sized Handbook FS-52 on Leschen slings and fittings is available from the A. Leschen & Sons Rope Co., St. Louis 12, Mo. Containing more than 100 illustrations showing standard wire-rope slings, grommet slings and multiple-part slings, the handy booklet also has charts of correct calculations for determining the size of slings required, correct sling angles in relation to loads, and other useful information.

(34) **PLASTIC PIPE**—Two illustrated "Answer Sheets" offered by Carlon Products Corp., Cleveland 5, present factual informative answers to the 22 most frequently asked questions about Carlon flexible and rigid pipe—what Carlon is, how it is installed, how the price compares with metallic pipe, recommended applications, diameters, weights, capacities, etc. Detailed instructions for the installation of Carlon pipe are presented and illustrated with step-by-step photographs.

(35) **4-YD SHOVEL** — Marion Power Shovel Co., Marion, Ohio, offers a 12-p Bulletin 402-A describing the Marion 111-M diesel shovel equipped with 4-cu yd dipper and available as standard shovel, long-range shovel or dragline. Features cited by the bulletin include Ward-Leonard electric swing, Marion air control and choice of two diesel power units.

(36) **DRILL BITS** — Booklet available from the Calumet Div. of Calumet & Hecla, Inc., Calumet, Mich., illustrates the two unusual drilling advantages of Liddicoat drill bits, the exclusive pilot construction design, and sturdy attachment of bit to the drill steel. Featured are Type L bits for easy-to-drill ground and Type H bits for strong rock and abrasive ground. Liddicoat one-use bits chip rather than pulverize to provide faster drilling at greatly decreased cost, the maker says.

(37) **IF YOU'D LIKE TO KNOW** how a diesel engine is built and how it works, request the new "Primer" written in simple, non-technical language and called "What You Should Know About Diesel Engines," offered by the P&H Diesel Div., Harnischfeger Corp., Crystal Lake, Ill. Its main objective is to show how simple the modern diesel engine is and how easy it is to understand its operation. The pocket-size booklet compares the diesel with the gasoline engine and reports latest design advancements.

(38) **V-BELTS**—New 8-p catalog offered by Thermoid Co., Trenton, N. J., features new simplified conversion tables with which, the company says, a user can determine, more quickly and easily than ever before, the correct Thermoid belt for various applications. Prices, dimensions, weights and construction details also are presented.

(39) **TO HELP USERS OF POWERED EQUIPMENT** to better understand the application of hydraulic couplings and torque converters, Twin Disc Clutch Co., Racine, Wis., has released a 32-p special issue of *Production Road*, titled "Coupling or Converter?". It explains where couplings or torque converters should be used—and why—with details of the meaning and characteristics of torque and the effect torque has on both driving and driven equipment.

YES—I would like more information . . .

Please send me catalogs or further information about the items from the Equipment News Section whose numbers are circled. (March, 1953)

1	5	9	13	17	21	25	29	33	37	41	45	49	53
2	6	10	14	18	22	26	30	34	38	42	46	50	54
3	7	11	15	19	23	27	31	35	39	43	47	51	55
4	8	12	16	20	24	28	32	36	40	44	48	52	56

In addition, please send me data on these OTHER products advertised in this issue (give name and page number) .....

.....

Name (Print) ..... **Position**.....

Company .....

Address .....

NOT GOOD if mailed after May 1, 1953

FIRST CLASS
PERMIT NO. 64
(Sec. 34.9, P.L.&R.)
NEW YORK, N. Y.

BUSINESS REPLY CARD
No Postage Stamp Necessary If Mailed in the United States

Postage Will Be Paid By—

McGRAW-HILL PUBLISHING CO., INC.

THE EDITOR, COAL AGE

330 WEST 42nd STREET

NEW YORK 36, N. Y.

(40) SHOVEL-CRANES—24-p Book 2428 fully describes and illustrates Link-Belt Speeder 51 Series crawler-mounted LS-51, truck-mounted HC-51, and wheel-mounted MS-51, ⅜-yd fully convertible shovel-cranes. Available from Link-Belt Speeder Corp., Chicago 1.

(41) WIRE ROPE—New 16-p booklet, "Wire Rope Recommendations for Mining Industries," is said to present the latest information on the "one best wire rope" to use with each type of mining equipment. Designated as DH-129A, it is offered by Hazard Wire Rope Div., American Chain & Cable Co., Inc., Bridgeport 2, Conn.

(42) CAR SPOTTER—How Trackmobile users are getting savings of as much as $11,500 per year, plus a wide variety of important additional benefits in freight-car handling, is told in Bulletin T-109, offered by Whiting Corp., Harvey, Ill. The folder discusses advantages both from a man-hour and dollar standpoint as well as the Trackmobile's flexibility in track or road operation and quick changeover from one to the other.

(43) HELICAL-GEAR DRIVES — their advantages, fields of application and correct selection—are discussed in new 16-p Book 2451, issued by Link-Belt Co., Chicago 1. All factors governing correct selection are covered for both double- and triple-reduction types, for capacities from fractional to over 100 hp and ratios up to approximately 300:1.

(47) FUSES—New complete GE electric-fuse catalog covers renewable time-delay fuses, one-time fuses, plug fuses, fuse holders and copper-link fuses. A technical data section also discusses how a fuse operates, maintenance hints, excerpts from the 1951 National Electrical Code pertaining to fuses, and dimensions of fuses and fuse holders. Available from General Electric Co., Bridgeport 2, Conn.

(48) WATER HOSE — Catalog Sheet 4800 published by B. F. Goodrich Co., Akron, Ohio, describes types of water hose designed for general service and for specialized uses, such as long-length heavy-duty hose for construction projects, road building and other high-pressure uses; and large-diameter hose for high-pressure water and air service in pile-driving operations, hydraulic bank grading, stripping and sluicing, and for heavy-duty service in mines where abrasion on cover is severe.

New Films Available for Showings to Interested Groups

For more information, circle number noted on postage-free card or contact manufacturer.

(44) Allis-Chalmers Mfg. Co., Milwaukee 1—"The Sky is the Roof," is a color sound film running about 12 min which features the newly developed A-C weather-protected motor for outdoor service. It traces the background and development of the motor and shows the varied storm tests to which it was subjected.

(45) Barber-Greene Co., Aurora, Ill.—16-mm sound-color film running about 22 min shows the functions and applications of the complete line of Barber-Greene equipment, with each type of machine in operation and in a variety of uses. It is narrated by Paul Harvey, radio and TV commentator.

(46) Euclid Road Machinery Co., Cleveland 17—16-mm sound film in color running 20 min shows the Euclid "Twin-Power" scraper in action in a number of applications, such as stripping, road building, construction and stockpiling of coal and ore.

(49) PILLOW BLOCKS—Bulletin A-620 offered by the Dodge Mfg. Corp., Mishawaka, Ind., provides complete data on the newly announced all-steel Dodge-Timken pillow blocks, available in sizes from 2 15/16 through 10 in. Besides specifications, etc., the bulletin simplifies determining effective application and selection of proper size.

(50) VARIED PRODUCTS available through its diversified facilities and many plants are outlined in a folder issued by American Car & Foundry Co., New York 8. In addition to ACF mine cars and mine-car parts, a wide range of products involving foundry, fabrication, weldment and machine-shop work are listed.

(51) CORROSION PREVENTION — Booklet offering practical suggestions to combat corrosion includes details on how and where coal-tar protection can be used to best advantage and offers case histories to show how corrosive problems have been overcome in many fields. Copy of "Where to Use Coal Tar Protection" available from Tapecoat Co., Evanston, Ill.

(52) PORTABLE PUMP—Bulletins 151 and 152 from the Carver Pump Co., Muscatine, Iowa, describe a newly designed 1½-in self-priming centrifugal pump, gasoline-engine-driven and said to be extremely portable and very easy to carry by one person. It will handle 6,000 gph at 17-ft suction lift (including friction) against 17-ft total head and will prime in less than 30 sec with pump 10 ft above water, the maker says.

(53) EQUIPMENT for buildings and institutions made by the Worthington Corp., Harrison, N. J., is covered in Bulletin WP-1099-B27M. It provides condensed information on sizes, dimensions, capacities, ratings and features of air-conditioning and refrigeration products; oil, gas and dual-fuel engines; deaerators and deaerating heaters; water conditioning; steam turbines and turbine generators; liquid meters; centrifugal pumps; regenerative turbine pumps; vertical turbine pumps; and multi-V-drives.

(54) PROTECTIVE COATINGS — Five bulletins describing Pitt Chem 100 Series of tar-base protective coatings are offered by the Protective Coatings Div., Pittsburgh Coke & Chemical Co., Pittsburgh 19. One bulletin gives specifications, uses and methods of applying all four coatings in the series. Other bulletins give detailed information on: Pitt Chem 101—heavy-duty coatings for severest corrosive conditions; 102—a thin high-gloss coating for general maintenance; 103—for surfaces exposed to corrosive vapors, dilute acids and alkalis; Pitt Chem 104—for long-lasting protection of drinking-water piping and tank interiors.

(55) RECIPROCATING PUMPS—Installation, operation and maintenance of Warren reciprocating pumps all covered in a new 20-p Service Manual 202. In addition, it includes general engineering information of special interest to plant-operating engineers. From Warren Steam Pump Co., Inc., Warren, Mass.

(56) SPEED RECORDERS—Data Sheet 81M, Metron Instrument Co., Denver 9, Colo., describes inkless strip-chart recorders now available in a wide range of speeds from 0 to 50 to 0 to 100,000 rpm, fpm, cycles per minute, yards per hour or any other units, with uninterrupted service for as long as 30 days on a single roll.

PREFORMED INTERNALLY LUBRICATED

Wire Rope

for cranes, hoists, elevators, and all equipment

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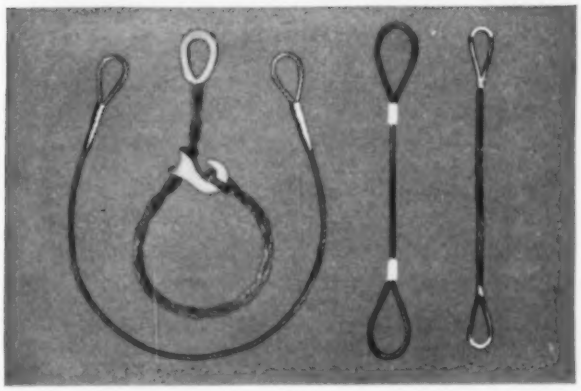

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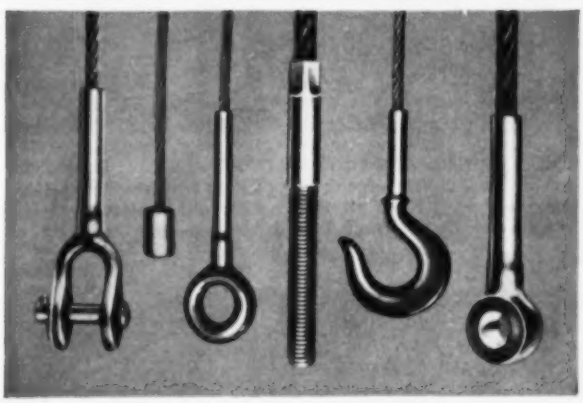

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News Round-Up

House Bills to Limit Imported Residual Oil

A BILL designed to establish a quota limitation on the quantity of residual fuel oil that can be imported into the United States was introduced into the House of Representatives Feb. 9 by Rep. James E. Van Zandt (R., Pa.). The measure would limit imports to only 5% of the domestic demand for residual fuel oil in any calendar quarter of the preceding year.

It was expected that a companion bill would be submitted to the Senate. By mid-February at least 15 other Congressmen had introduced identical bills into the House and others were expected to follow suit.

Spearheading the fight, the National Coal Association called a "Foreign Oil Policy Conference" for March 4 in Washington, on behalf of management and labor representatives of the bituminous coal, anthracite, independent oil and railroad industries. Purpose of the meeting is to "provide a forum for full discussion of the foreign residual problem and to work out a policy that will meet the approval of all concerned," said Tom Pickett, NCA executive vice president. He urged full attendance to obtain "all-out support" for the joint efforts of industry and labor in the battle to secure quick Congressional relief from the heavy losses being incurred by the affected industries.

Earlier, on Jan. 27, the Executive Committee of the National Coal Association at a special meeting in Washington passed a resolution calling on Congress "to provide for an adequate quantitative limitation on imports of foreign residual oil." The resolution declared that such imports inflict "incalculable damage" on the bituminous coal industry and pointed to the need for maintaining the industry at maximum strength as essential to the nation's defense, security and welfare in peace or war. It condemned "unwise dependence" on foreign sources of fuel as "contrary to the best interests of the nation."

The resolution was based on a recommendation of the NCA Natural Resources Committee, which had just completed a study of residual oil imports. Chairman of the Natural Resources Committee is R. E. Snoberger, president, Truax-Traer Coal Co., and other members include: George H. Love, Pittsburgh Consolidation Coal Co.; J. D. Francis, Powellton Coal Co.; Charles J. Potter, Rochester & Pittsburgh Coal Co.; F. A. Fontyn, Ebensburg Coal Co.; Rolla D. Campbell, Island Creek Coal Co.; W. H. Naylor, Pocahontas Fuel Co., Inc.; and K. A. Spencer, Pittsburg & Midway Coal Mining Co.

Editor's Note—For a thorough analysis of the effects of foreign oil imports on the coal industry and the nation's economy, and a suggested program of action, read the staff-written article on pp 70-75 of this issue.

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Fund Tightens Rules

Trustees of the Bituminous Welfare & Retirement Fund have adopted new rules governing pensions, rehabilitation and maintenance-aid cash benefits, hospital and medical benefits and payments to widows and survivors. The new changes, according to Josephine Roche, director, recognize the gradual elimination of "the

Pocahontas Fuel Fetes Retiring Officials

EIGHTEEN RETIRING OFFICIALS of the Pocahontas Fuel Co., Inc., Pocahontas, Va., were honored at a dinner given by the company Jan. 24 at the West Virginian Hotel, Bluefield. The group, which collectively totaled 669 yr of service with the company and its predecessors, was the first retiring on the pension program that went into effect last Oct. 1, reported A. R. Matthews, company president.

Dean of the group was A. G. Russell, who retired as land agent after 51 yr of service. Next in length of service were Franklin D. Black, who retired in 1950 as a chief electrician after 48 yr with the company; and R. L. Hutcherson, with the company since 1899, who recently retired as superintendent of the Switchback properties. Also present at the dinner was Charles Harris, who had worked 63 yr in coal mines without an accident. Mr. Harris had been with Pocahontas Fuel for 27 yr before he retired 2 yr ago as a machine-shop foreman.

Members of the retiring group attending the dinner and shown above included: J. T. Lynch (seated, left), H. F. Hancock, A. G. Russell, R. S. Wallace, G. L. Slate, Charles Harris, Frank Black (standing, left), H. E. Young, Henry A. Dooley, R. L. Hutcherson, R. E. Cassell, W. W. Pennington, C. M. Thacker, J. W. Groseclose and H. N. Morris.

backlog of human misery" existing at the time the fund was set up. Briefly, the new rules are:

1. Addition of a new pensions-eligibility clause requiring 20 yr of classified service in the industry within the 25 yr preceding request for a pension and regular employment immediately prior to May 28, 1946.

2. Provision that applicants for rehabilitation and maintenance aid must have been employed in the industry after May 28, 1946. The same cut-off date applies to miners and dependents seeking hospital and medical care. Dependents are defined as members of a miner's immediate family who have lived with the miner for 1 yr immediately preceding the application for hospital and medical care.

3. Establishment of a $500 funeral-expense benefit and a $500 widow's and survivors' benefit instead of the old $1,000 death benefit. Widow's and survivors' benefits are to be paid in 10 instalments but only to survivors of miners who already were on the fund's rolls or who have been employed in the industry since May 28, 1946.

4. Provision that maintenance aid for widows and dependent children is dependent on employment by the deceased after May 28, 1946, unless at the time of death the deceased was receiving benefits. Similar requirements govern hospital and medical care for widows and dependent children.

Two Coal Companies Win Management Excellence Award

Certificates of management excellence have been awarded for the third time to Pittsburgh Consolidation Coal Co. and for the second time to Lehigh Coal & Navigation Co., according to recent announcement by the American Institute of Management, New York City, which created the award. Only 330 companies out of 3,000 leading concerns in the United States and Canada were similarly honored in 1952. Ratings are based on economic function, corporate structure, health of earnings growth, fairness to stockholders, research and development, directorate analysis, fiscal policies, production efficiency, sales vigor and executive evaluation.

News Briefs and Trends

Iowa Companies Sue Inspectors To Test Federal Safety Law

Two Iowa coal mining companies, the Lovilla Coal Co. and the O'Brien Coal Co., have brought suit against two federal mine inspectors in an effort to challenge the constitutionality of the 1952 Federal Coal Mine Safety Act. The firms state that the inspectors threatened to close their operations unless they ceased using black powder, although the use of black powder is permitted by Iowa mining laws. In Illinois, the Wenneborg Coal Co., Sherman, planned to re-open its mine Jan. 26 using permissible powder "under protest." The mine had been closed several days previously by federal inspectors for using black powder and permission to re-open had been granted on discontinuance of the practice.

Straw in the Wind?

The Illinois Central R. R. and the Louisville & Nashville R. R. have obtained approval of reduced freight rates on raw steam coal and industrial screenings from western Kentucky into Louisville. The new rate is $1.50 per ton against the old $1.75. The railroads were facing loss of revenues to barge lines.

UMWA Favors, Others Oppose W. Va. Coal Depletion Tax

John L. Lewis has urged miners in West Virginia to support a 10c-per-ton depletion tax on coal production. Income from the tax would be spent for additional roads and schools. Mr. Lewis' statement followed a conference Feb. 8 with Gov. Marland at White Sulphur Springs, W. Va. Earlier, CIO and AFL leaders had voiced their support of the proposal. In addition to the coal tax, there would be a 25c-per-barrel tax on oil and similar levies on other exploited resources. Opposition has been expressed by the state Chamber of Commerce and other business organizations. In the legislature, some Democrats have joined with minority Republicans to resist the proposal.

Supreme Court Makes Anti-Coercion Order Stick

The U. S. Supreme Court Jan. 19 refused to review the decision of the Circuit Court of Appeals upholding an NLRB order restraining the UMWA from coercing non-union miners in western Kentucky. The case had its origins in 1949, when the UMWA attempted to organize six mines in that area. The NLRB then found that the union by force and threats of violence had denied employees their right to refrain from joining a union. The NLRB order protected not only employees at the six mines affected but also those at all other mines within the geographical limits of District 23, UMWA.

Bureau Seeks Germanium In Coal Ash and Stacks

A search for additional sources of the costly metal germanium for use in radar and other electronic equipment of the armed forces has been launched by the U. S. Bureau of Mines in ash pits and smoke stacks of large industrial consumers of coal. The rare element, now produced in the United States in small amounts as a by-product of zinc refining, also appears in minute quantities in many American coals, but at present it is uneconomical to recover directly from the coal, the Bureau reports. The best method is to extract it from the ash resulting from the burning of coal, said R. C. Corey, of Pittsburgh, chief of the bureau's coal branch in the Northeastern Region, where the germanium research project is being conducted at the request

Continued on p 166

COAL MEN ON THE JOB

TURNER ELKHORN MINING CO., Drift, Floyd County, Ky., and affiliated companies. Officials snapped after a safety dinner held in Prestonburg, Feb. 1, include: E. R. Turner (seated, left), assistant foreman; Ivel Moore; John P. Sammons; Ben Stewart; J. B. Fraley; and M. K. Reed, general manager; back row: Lloyd McGarey (left); Dewey Lawson; Alan Reed; William Slone; Willie Parker; Belford Reitz, assistant foreman; Jack Robinson, Rhuel Breeding, assistant foreman; Beecher Hardwick, assistant foreman; Ralph Moore; Ed Hunt, assistant foreman; Tramble Mitchell, assistant foreman; and Dick Stowers. (All are foremen except as noted.)

High wall face of stripping operation in southwest Virginia.

Excellent breakage with Du Pont "Nitramon" speeds removal of overburden

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"Nitramon" and its companion "Nitramex" offer coal stripping operators many advantages. Both are the safest blasting agents known. They cannot be detonated with commercial blasting caps or by open flame, friction, falling objects or even the impact of rifle bullets. And yet, a "Nitramon" Primer—itself relatively insensitive—dependably detonates every charge.

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**Reg. trade mark for ammonium nitrate blasting agent.

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Personal Notes

Harry M. Johnstone, manager of Gorgas Coal Mines, Alabama Power Co., since 1942, has been named general manager of the Gorgas mines. A graduate of Alabama Polytechnic Institute, he was at one time superintendent of mines, Jagger Coal Mines, Prospect, Ala., and Galloway Coal Co., Carbon Hill, and assistant state mine inspector at Birmingham from 1930 to 1932. Before joining Alabama Power in 1942, Mr. Johnstone was general superintendent of coal mines, Republic Steel Corp., Sayreton.

Charles S. Kuebler, planning engineer since 1951, has been named assistant mining engineer, Lehigh Navigation Coal Co., Lansford, Pa. A graduate of Lafayette College, Mr. Kuebler joined the Old Company in 1938 as special engineer in the mining department. He was Lansford district superintendent before becoming planning engineer.

Ray Callahan, former special assistant to the vice president, Pennsylvania Coal & Coke Corp., has been appointed assistant general superintendent of mines, Johnstown Coal & Coke Co., Johnstown, Pa. Mr. Callahan had been associated with Pennsylvania Coal & Coke for 35 yr.

E. M. Bane, general manager, D.J.B. Collieries Co., Grundy, Va., has been named president of the company, succeeding the late **Zach A. Justice.** Other officers elected at the same time were **A. Charles Justice,** Pikeville, Ky., vice president, and **W. H. Davison,** Bluefield, W. Va., secretary-treasurer.

The retirements of **J. P. Horne** as vice president and general manager, and **James Hagy** as general superintendent, were announced last month by the Jewell Ridge Coal Corp., Tazewell, Va. Mr. Horne will continue with the company as a consultant and Mr. Hagy is to be transferred to a special engineering assignment. **E. E. McBurney,** formerly production engineer, has been named to succeed Mr. Hagy, but the position held by Mr. Horne will not be filled, the company said.

A. R. Long Sr. has been named chairman of the board, and **A. R. Long Jr.,** president, of the Brookside Pratt Mining Co., Birmingham, Ala.

F. Edgar Kudlich, since 1952, manager of engineering, Glen Alden Coal Co., Wilkes-Barre, Pa., resigned March 1. Mr. Kudlich, who has not as yet announced future plans, joined the company in December, 1947, as senior assistant mining engineer and shortly thereafter was advanced to mining engineer. The post of manager of engineering has been merged into other functions as part of rearrangement of management duties, the company reported.

Dr. Edward Steidle, dean of the School of Mineral Industries, Pennsylvania State College, since 1928, will retire June 30. **Dr. Elburt F. Osborn,** associate dean of the school, has been named to succeed Dr. Steidle. A graduate of Penn State in 1911, Dr. Steidle held various mining engineering positions in the United States and Canada, and with the U. S. Bureau of Mines, from 1912 to 1917. Upon his return from World War I in 1919, he was appointed to the faculty of Carnegie Institute of Technology, organizing programs in mining, fuel technology and metallurgy in cooperation with the Bureau of Mines. In 1928 he was appointed dean of the School of Mining and Metallurgy at Penn State, reorganizing it in 1930 into the School of Mineral Industries. Dr. Osborn, who joined the Penn State faculty in 1946 as head of the earth sciences department and professor of geochemistry, was named associate dean in April 1952. He has done extensive research in the fields of petrology, economic geology, geochemistry and silicate chemistry.

F. M. Morris, formerly chief engineer of the Compass Coal Co., a Clinchfield subsidiary, has been named chief en-

(Continued on page 154)

Glen Alden Elects President

FRANCIS O. CASE, vice president, Anaconda Copper Mining Co., since 1949, has been elected president of Glen Alden Coal Co., Wilkes-Barre, Pa. A graduate of Cornell University, he joined Anaconda in 1922 as manager of the Midwestern district, serving in that capacity until 1942, when he was in charge of a government-owned magnesium plant in Nevada, under contract with Anaconda. From 1945 to 1949, Mr. Case served as assistant to the president and was made operating vice president of Anaconda Wire & Cable Co., a subsidiary. He became vice president of the parent company in 1949, and in 1952 was named president of another subsidiary, Anaconda Aluminum Co.

Bradford Coal Names General Superintendents

APPOINTMENTS of Russell Maxwell (left) as general superintendent of open-pit operations and W. S. Merrow (right) as general superintendent of deep-mine operations for the Bradford Coal Co., Bigler, Pa., were announced last month by R. S. Walker, general manager of the company. Mr. Merrow, who was previously superintendent of the firm's Aurora Nos. 5 and 6 mines, served as assistant foreman, mine foreman, superintendent, and superintendent of mines for the Morrisdale Coal Co. from 1937 until joining Bradford in 1948. Mr. Maxwell, who worked as a miner before entering the army, has been associated with the company since his discharge from the service in January, 1946. The advancements of Robert B. Hutchinson to assistant to the general manager and Cecil Morris to general traffic manager also were announced.

whys ?

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SAFETY DEANS AT RED JACKET—Foremen Charles Turk (left) and Norman Presley lead the list of safe foremen at Red Jacket mines with records of 6 yr of supervision without a lost-time injury to any of their men. Mr. Turk is at Mitchell Branch; Mr. Presley, Keen Mountain.

TROPHY WINNERS—Fred Kyle (left), gen. mine foreman, day shift; E. S. Ferrell, assistant superintendent; A. F. Cook, superintendent; and E. S. Burleson, general mine foreman, night shift, display 1952 award to Mitchell Branch mine, safety leader in the Red Jacket group.

ONE-YEAR CLASS AT RED JACKET—Part of the total of 55 foremen who were honored for 1 yr of supervision without a lost-time injury.

Red Jacket Honors 97 Foremen for Safety

FOR SIX CONSECUTIVE YEARS, Foremen Norman Presley, Keen Mountain mine, and Charles Tuck, Mitchell Branch mine, have supervised their men without a single one suffering a lost-time injury. They led the list of 97 Red Jacket Coal Corp. foremen honored for supervising crews for periods of 1 to 5 yr without a lost-time injury at a dinner given by the company at the Mountaineer Hotel, Williamson, W. Va., Jan. 17.

Mitchell Branch mine won the company trophy for the best safety record for 1952. This operation, employing 364 men and producing 3,000 tons per working day, achieved a frequency rate of 13.15 and produced 72,513 tons of clean coal per lost-time injury. The trophy was presented by Harry F. Weaver, acting chief, coal mine inspection branch, U. S. Bureau of Mines, Vincennes, Ind.

1,358,000 TONS—NO INJURIES

The 97 foremen honored at the dinner produced 1,358,000 tons without a lost-time injury. At the first Red Jacket safety dinner in 1947, to reward injury-free foremen in 1946, only 14 men qualified. That year marked the beginning of the company's concentrated drive on safety. The frequency rate was 85.51. The steady increase in the number of foremen qualifying and the decrease in frequency rate are attributed largely to both the intensive company safety campaign and the aid rendered by the U. S. Bureau and the West Virginia Department of Mines.

Principal speakers at the dinner included J. W. Damron, chairman of the board, and William M. Ritter, newly elevated to the presidency. Awards by classes were as follows:

Six-Year Men—Savings bonds, coveralls and certificates; presentation by T. C. Higgins, supervising inspector, U. S. Bureau of Mines, Welch, W. Va.

Five-Year Men—Clocks, coveralls, certificates and all-expense trips; presentation by J. H. Edwards, associate editor, *Coal Age*.

Four-Year Men—Gold tie clasps, coveralls and certificates; presentation by Joseph Bierer, acting chief, West Virginia Department of Mines, Charleston, W. Va.

Three-Year Men—Certificates and hard hats with insignia; presentation by E. E. Quenon, chief, accident and health division, U. S. Bureau of Mines, Mt. Hope, W. Va.

Two-Year Men—Special belts and certificates; presentation by J. B. Benson, chief, accident and health division, U. S. Bureau of Mines, Norton, Va.

One-Year Men—Certificates and hard hats with insignia; presentation by T. J. Whalen, supervising inspector, U. S. Bureau of Mines, Logan, W. Va.

Honorable Mention—Special belts for clearing their safety records; presentation by C. H. Williams, assistant chief engineer, Red Jacket.

THE HONOR LIST

Foremen honored at the 1953 dinner, besides Messrs. Presley and Tuck were:

Five-Year Group

Keen Mountain—Leonard Skeens.
Mitchell Branch—Homer Mahone.

Four-Year Group

Keen Mountain—W. M. Harlow, Curt Matney and Frank Stout.
Coal Mountain—Orville Godfrey and Frank Mosolgo.
No. 17—H. B. Artis and Jim Backus.
Wyoming—Ira Bradford.
Red Jacket Outside—Harry Davis

Three-Year Group

Junior—Russell Williamson, John Halley and Frank Melmige.
Mitchell Branch—Herbert Williamson and Bill Curry.
Wyoming—Dale Browing and Bill Lester.
No. 17—Walter Murphy.
Red Jacket Outside—James A. Maynard.

Two-Year Group

Keen Mountain—Dexter Vance, John Spradlin, S. A. Cook, Ivory Killen, J. M. Hutchinson, J. H. Damron, W. D. Dye, T. A. Copley, Glenn Snead and Millard Plymal.
Junior—J. Carl Cook, Rufus Sipple and F. C. Daniels.
No. 17—Tom Franklin and Golden Barrett.
Mitchell Branch—Emory Osborne.
Coal Mountain—Jay Walls.
Red Jacket Outside—P. G. Willis.

One-Year Group

Keen Mountain—R. S. Dean, Charles Owens, Eugene Farmer, Bernard Farmer, Clyde Looney, R. C. Collins, George Thomason, W. O. Bohon. Henry Shell.
Junior—George Williamson Jr., Bill Roberson, Bill Dehart, W. D. Brown, Okey Pack, C. E. Edwards, W. C. Hammond, Ralph Milam, A. A. Mankin and Dave Ratliff.
Mitchell Branch—Stuart Chafin Jr., Perry Hackney, Harold Cline, Ralph Staten, John Tiller, Vernon Cisco, Charles T. Scott, Reece Ferrell, Fred Sears, Tom Hammond, C. L. Eanes and Ireland Frederick.
Wyoming—Willis Farmer, John A. Short, Grover Bradford, Roy Cook, C. R. Shelton, Charles Morris, Ward L. Cook and Tom Blankenship.
No. 17—Russell Burleson, Tom Ramey, Tony Webb, James Edwards, Harold Phillips, F. N. Bensey and Paul Smith.
Coal Mountain—C. P. Keith, William Woodward, Ernest Jesse, Jesse Fortner, Spencer Barnette, Gussie Morgan, George Ritter and Vencil Travis.
Red Jacket Outside—Ernest Stallard.

Red Jacket production and honor-roll members by years is as follows:

	Honor-Roll Foremen	Red Jacket Production
1946	14	2,767,000
1947	47	3,200,000
1948	76	2,982,000
1949	116	2,167,000
1950	114	2,826,000
1951	82	3,746,000
1952	97	3,622,000

120 Tons UP... 40 Tons DOWN

"Tip-toe" Controlled

Hume-Sinclair's 120-ton GVW Dart truck, equipped with Model CF Converter. Twin Disc Truck Type Converters are available in 2 series, 7 capacities each, to handle the majority of heavy-duty truck engines available.

To haul 80 tons of strip-mined coal from pit to tipple, Hume-Sinclair Coal Mining Co., Hume, Mo., ordered a 40-ton tractor-trailer rig from Dart Truck Co. By building a Dart tractor and cab to specification—adding a semi-trailer bigger than a hopper car—and installing a Cummins 400 hp V-12 supercharged diesel engine and a Twin Disc Model CF Truck Type Torque Converter, Dart delivered the super-sized truck.

From the first, the big truck has pulled out of the pit and up the hill with its 80-ton payload—*in high gear*. The driver simply steps on the accelerator to automatically get up-to-6:1 torque multiplication—highest in the field—and keep 120-tons GVW *moving*. On the trip back down, with 40 tons of truck, the driver merely lets up on the accelerator to bring Twin Disc's exclusive Converter Braking feature into action; saving brakes, tires, driving train—*and* operator fatigue.

Whatever type trucks you're using—diesel, gasoline, butane—a Twin Disc Truck Type Converter may be your answer to faster work cycles and reduced costs. Call, write or wire Twin Disc—ask for new Truck Type Converter Bulletin No. 501.

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Million Tons per Fatality Marked By Big-Sandy Elkhorn Institute

TWO- TO FIVE-YEAR LEADERS—part of the group honored for safety achievements pose with institute officials: seated left, Thomas DeMurray, 2 yr; Dock Fraley, 5 yr; Luther Varner, 3 yr; W. P. Mink, 4 yr; Hillard Stone, 2 yr; and Warnie Flint Jr., 3 yr; standing, Frank Childers, 4 yr; Robert England, 2 yr; J. H. Mosgrove, safety director, Big Sandy-Elkhorn Mining Institute; A. D. Sisk, chief, Kentucky Department of Mines and Minerals; A. M. Ayres, institute president and superintendent, Russell Fork Coal Co.; and Rex Lawrence, 4-yr safety foreman.

ONE-YEAR ACCIDENT-FREE LEADERS include James Conley (seated left), Brack Colwell, Clyde Morley, Roy Conley, Herman Colwell, Jack Fraley; standing, Henry Ison, L. B. McWilliams, James Camp, Oliver Marshall, Chris Branham, Worley Mace.

ACHIEVEMENT for the first year (1952) of a fatality rate exceeding a million tons was celebrated by the Big Sandy-Elkhorn Mining Institute at a regular monthly dinner meeting at Pikeville, Ky., Jan. 31. Of the 42 mines in the institute, six completed 1952 without a lost-time injury:

Hendrix, Consolidation Coal Co. (Ky.).
Hellier No. 2, Caudill-Ward Coal Co.
High Point Elkhorn Coal Co.
Puncheon, Utilities Elkhorn Coal Co.
Farwest Coal Co.
Liberty No. 3, Turner-Elkhorn Mining Co.

Hendrix mine has gone 15 mo without a lost-time injury, and Consol of Ky. achieved a 1952 frequency rate of 7.9 for its three mines.

SEVENTY FOREMEN HONORED

Seventy foremen were awarded buttons for accident-free supervision ranging up to 7 yr. A. D. Sisk, chief, Kentucky Department of Mines and Minerals, spoke on safety progress in Kentucky, outlined some of the provisions and results of the new Kentucky mine law, called attention to the danger of underground belt fires, and noted that one company is considering sprinkler heads along all its belts. Honor foremen were as follows:

Seven Years

Consolidation Coal Co. (Ky.)—Dewey Looney.

Five Years

Consol of Ky.—Drexel Webb.
Princess Elkhorn Coal Co.—Wilnar Branham.
Eastern Gas & Fuel Associates—Dock Fraley.

Four Years

Consol of Ky.—Rex Lawrence, W. P. Mink, Charles L. Adams, Victor Mullins.
Princess Elkhorn—Warnie Short.
Inland Steel Co.—Frank Childers.

Three Years

Princess Elkhorn—Joe Tussey, Dow Webb, M. E. Thompson.
Eastern Gas & Fuel—O. E. Oney.
Consol of Ky.—Andy Branham, Allard Wright, Luther Varner, Warnie Flint Jr., Covie Amburgy.
Inland Steel—Clyde Cannon.

Two Years

Consol of Ky.—E. K. Osborne, James Whited, J. B. Davis, Ed Boggs, D. C. Higgins.
Inland Steel—Thomas DeMurray, Robert England, Leonard Engle, Hillard Sloane.
Princess Elkhorn—Dallas Vanhoose.
Eastern Gas & Fuel—Selsus Dutton, Elmon Music.

One Year

Princess Elkhorn—Bill Titlow, Walter Crace, David Brickford, Carl Bingham, Jesse Webb, Peter J. Capelli, Oliver Marshall.
Inland Steel—J. T. Anglain, Homer Preston, Clyde Mosley, Chris Branham, Ralph Banks, James K. Daniels, James Camp, Charles Luxmore, Blaine Cooper, Roy Conley, James E. Conley, Brack Colwell, Herman Colwell, Henry Ison, Worley Mace.
Consol of Ky.—L. B. McWilliams, Glen Berry, H. C. Gibson, Henry Sparks, D. C. Higgins, Millard Preston, Estill Caudill, Ed Wright, R. C. Collier, Denver Plummer, Fritz Nelson, Henry Horner, Charles H. Adams, Wm. H. Sergent, Stephen J. Toth.
Eastern Gas & Fuel—Jack Fraley.

Anthracite Group Blueprints Public Relations Program

A program embodying a new approach for anthracite-industry public relations was announced late in January by a committee representing anthracite producers and retail dealers. The program is designed to mobilize all branches of the industry in a concerted effort to improve public understanding of anthracite's inherent advantages as a home fuel, assist sales and merchandising at the retail level, and serve other industry interests.

Members of the special committee are: Marcus C. Ralston, president, Eastern States Retail Solid Fuel Conference; Everett J. Decker, president, Peterson & Packer Coal Co. and New York State Fuel Merchants' Association; Hugh O. Tompkins, managing director, Fuel Merchants' Association of New Jersey; H. H. Shaver, general sales agent, The Hudson Coal Co.; and F. W. Earnest Jr., president, Anthracite Institute.

To set up and supervise the program, the committee selected Public Relations Management Corp., an amalgamation of leading regional public relations firms with 23 offices in the United States and Canada. Seven of the partner firms are strategically located in the anthracite production and marketing areas. State and regional studies will become the basis for applying public relations techniques to local problems. This is one of the basic concepts of the new program—to extend activities into the smaller communities.

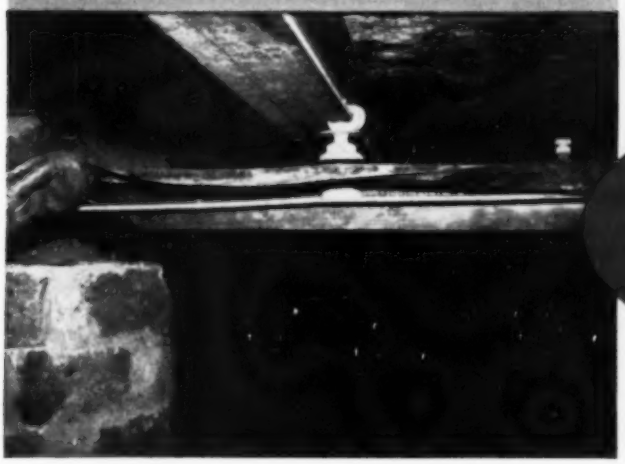
O-B I-Beam Adapter
With 5/8" stud: No. 21846
Without stud: No. 21845

O-B I-Beam Adapter Locates Trolley Hangers Accurately

Speeds Line Work, Too!

Just before stringing wire, held with O-B Bulldog Clamps, this illustration shows how hangers can be lined up with track. Collectors ride smoothly, swiftly, on neat, straight trolley wire.

Closer view of adapter, hanger, clamp and rubber wire guard.



● To attach trolley and feeder materials on I-beam supports quickly, you can't beat these O-B I-Beam Adapters. They line up nicely, too, making trolley wire run straight as a die! All kinds of line material work with this handy little clamp. Furnished with a 5/8" bolt, it holds any fitting with a tapped boss. Without the bolt, it holds clevises and strap-held accessories.

O-B Trolley and Feeder Materials work hand-in-hand with these adapters. The combinations — and the jobs you can do with them — justify your keeping a good stock on the shelves all the time. If you haven't worked with them before, let a trial order convince you that they're handy to have around!

Ohio Brass

MANSFIELD OHIO, U. S. A.

4337-M

Harman-Feds Creek Foremen Honored for Safety Records

HARMAN LEADERS for 1 to 4 yr (section foremen except as noted)—seated, Howard Meade (left), 1 yr; W. A. Vance, 2 yr; Carson Newberry, 2 yr; Carter Senters, 2 yr; Sidney Potter, 1 yr; A. V. Sturgill, 3 yr; Robert Cook, 1 yr; standing, Frazier Fletcher, mine foreman, 1 yr; R. H. Sargent, preparation foreman, 1 yr; Coy McGlothlin, 1 yr; Neil Whitt, 1 yr; Kelly Dales, 1 yr; Auty Branham, 1 yr; John Goff, 3 yr; Elmer Perdieu, tipple foreman, 2 yr. Roy Landreth, 4 yr, was absent.

FEDS CREEK LEADERS for 1 to 2 yr (section foremen except as noted)—seated, Carl Howard (left), 1 yr; Benton Deel, 1 yr; Bart Elswick, general outside foreman, 2 yr; Corbett Belcher, tipple foreman, 2 yr; standing, Harold Dale, 1 yr; Jonah Stiltner, 1 yr; McKinley Lester, 1 yr (absent, Carter Fleming, 1 yr).

HARMAN-FEDS CREEK OFFICIALS—seated, Robert Wilson (left), mine foreman, Feds Creek; I. J. Richardson, president; W. B. Herndon, superintendent, Harman; R. V. Venable, general superintendent; Leland Mahan, Underwriters Safety & Claims; T. G. Osborne, assistant general superintendent; W. R. Campbell, Underwriters Safety; standing, M. L. Farmer, purchasing agent, Harman and Feds Creek; Henry Altizer, mine foreman, Harman; E. B. Sturgill, mechanical foreman, Harman; E. N. Harris Jr., controller and secretary-treasurer; Frank Landreth, mine foreman, Harman; Bill Belcher, chief electrician, Harman and Feds Creek; Millard Carroll, superintendent, Feds Creek; John Steele, mine fore. Feds Creek; Elbert Asbury, safety inspec., Harman and Feds Creek.

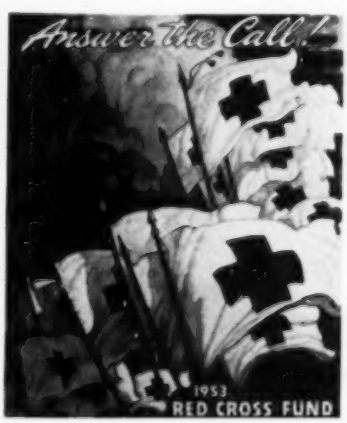
ROY LANDRETH, section foreman, H. E. Harman Coal Corp., Harman, Va., received top honors for four consecutive years of accident-free supervision at a safety meeting and luncheon of the Harman organization and the affiliated Feds Creek Coal Co. Jan. 31. Twenty-three other foremen in the two companies also were honored at the same meeting for records of 1 to 3 yr.

I. J. Richardson, president of the two companies and first of several speakers on the program, pointed out that while he and other officials had always believed in producing coal safely and the companies had marked up better-than-average records, they were far from satisfied with severity and frequency rates and compensation costs. As a result, they employed Underwriters Safety & Claims, of Louisville, Ky., to look into their situation and render all help possible. Compensation cost was reduced to 51% of the average for the preceding 3 yr in the first year of operation, to 38% in the second year, and to 12% so far in the third year.

Remarking that an improved cost and accident record must always originate with top officials, Leland M. Mahan, general counsel for Underwriters Safety & Claims, which handles reinsurance and represents Lloyds of London, pointed out that Harman and Feds Creek officials deserved a large share of credit for the improvement.

Other speakers were: Joe Malesky, assistant to the engineer in charge, U. S. Bureau of Mines, Norton, Va.; Elmer Layne, senior inspector, Kentucky Department of Mines and Minerals, Pikeville, Ky.; J. H. Mosgrove, safety director, Big-Sandy-Elkhorn Mining Institute, Harold Wiley, Federal mine inspector, Norton; W. D. Jenkins, branch manager, Underwriters Safety & Claims, Pikeville; R. V. Venable, general superintendent, Harman and Feds Creek; Ted Osborne, assistant general superintendent; J. H. Edwards, associate editor, *Coal Age;* and W. R. Campbell, safety director, Underwriters Safety & Claims.

Harman mine produces approximately 3,700 tons per day and employs 450 production men. Feds Creek mine, in Pike County, Kentucky, produces 3,400 tons with 475 production men.



In-cycle Bolting Gives Immediate Roof Support

It's easy with O-B Shells and Plugs

In-cycle roof bolting works into face operations smoothly when O-B Shells and Plugs are in use. Bolting crews move into rooms, bolt them, and leave without a bit of lost time for the rest of the face crew. Swift bolting is possible with O-B Shells and Plugs because:

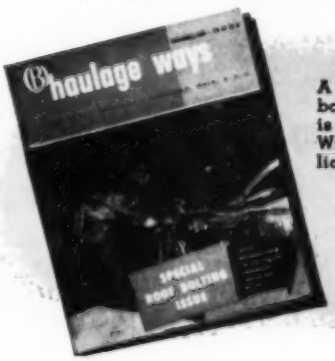
1. O-B Shells conform readily to hole diameters from $1\frac{7}{8}$ inches to $1\frac{5}{8}$ inches without any adjustment. Reasonable bit wear (with $1\frac{3}{8}$" bits) does not hamper bolt insertion.

2. No lugs or projections are needed on the outer surfaces of O-B Shells or O-B Plugs. Units employing this means to prevent turning frequently dig in before the bolt is raised to full depth. This slows bolting progress; sometimes prevents a hole from being used. Lost holes cost time!

Better protection and better production result from in-cycle bolting, and it's practical when you use swift, sure O-B Shells and Plugs. They go up easy and they stay put!

Two-man bolting crew has set 153 bolts with O-B shells and plugs during a 6½ hour period, and averages 90 bolts in a normal shift of that length, using 42-inch bolts!

O-B Expansion Shell and Plug for ¾-inch roof bolts and threaded rods, No. 21889. Illustration shows correct lap between shell and plug for speedy installation in roof.



A copy of this 20-page booklet on roof bolting is yours for the asking! Write for it. Ask for Publication 2768-M.

4333-M

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at a price you can afford

PRE-SET, TAMPER-PROOF TIMING

Practically non-breakable, Durakool Pre-set Timer Relays have more than proved themselves on the roughest and toughest jobs that could be found. Year by year, their use increases in sensational fashion. Controlled time available from .15 to 20.0 seconds in either normally open or normally closed actions. 3 to 4 week delivery. No waiting. Your production schedule is met.

★ No false contacts
★ No chatter
★ Quiet in operation
★ Eliminates double contacting or breaking of circuit

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DURAKOOL, INC., Elkhart, Ind.

Durakool

ALL-STEEL MERCURY *Timers*

New Mine Developments

Penelec Buys Power-Plant Site, Contracts for Coal Supply

Purchase from the Allegheny River Mining Co. of a 60-acre site on the west bank of the Allegheny River, 4 mi north of Kittanning, Pa., for the location of a coal-burning steam-generating power plant has been announced by the Pennsylvania Electric Co. At the same time, it reported that arrangements for the coal requirements of the proposed station had been made with the Pittsburgh & Shawmut Coal Co., sales agents for Allegheny River Mining and other companies. The plant site, acquired for $31,500, was selected for its proximity to water supply and vast coal reserves after engineering studies showed the future need for additional generating capacity in the west central section of the company's system, O. Titus, Penelec president, reported. Penelec is currently building its largest generating station at Shawville, Pa., and recently obtained a 500-acre tract on Lake Erie for a proposed future generating station. It is presently engaged in a construction program estimated to cost $40 million in 1953 and $95 million by the end of 1955.

Jewell Ridge Acquires Another W. Va. Property

Acquisition of the Wanda mine of the Wanda Mining Co., Inc., Wanda, Logan County, W. Va., was announced last month by the Jewell Ridge Coal Corp., Tazewell, Va. Capacity of the property is being enlarged to 1,500 tpd, with employees increased to 125 men. A McNally Pittsburg washery, including a jig purchased from the Winco Block Coal Co., is currently being installed and is expected to be in operation by May 1. The three Logan County mines of the Hutchinson Coal Co., whose purchase was reported last month, will be operated as the Jewell Eagle Coal Co., company officials also announced.

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For every welding and cutting need!

TAKE TORCHES AND REGULATORS, FOR INSTANCE... Your authorized Airco dealer maintains a full supply of moderately priced outfits for welding . . . brazing . . . heating . . . cutting . . . or soldering. If no standard set-up meets your particular requirements, he can recommend the proper combination of units — and assemble your special-purpose outfit from stock.

Every item is backed by the AIRCO reputation . . . and delivered promptly to your door!

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REPRESENTED INTERNATIONALLY BY AIRCO COMPANY INTERNATIONAL
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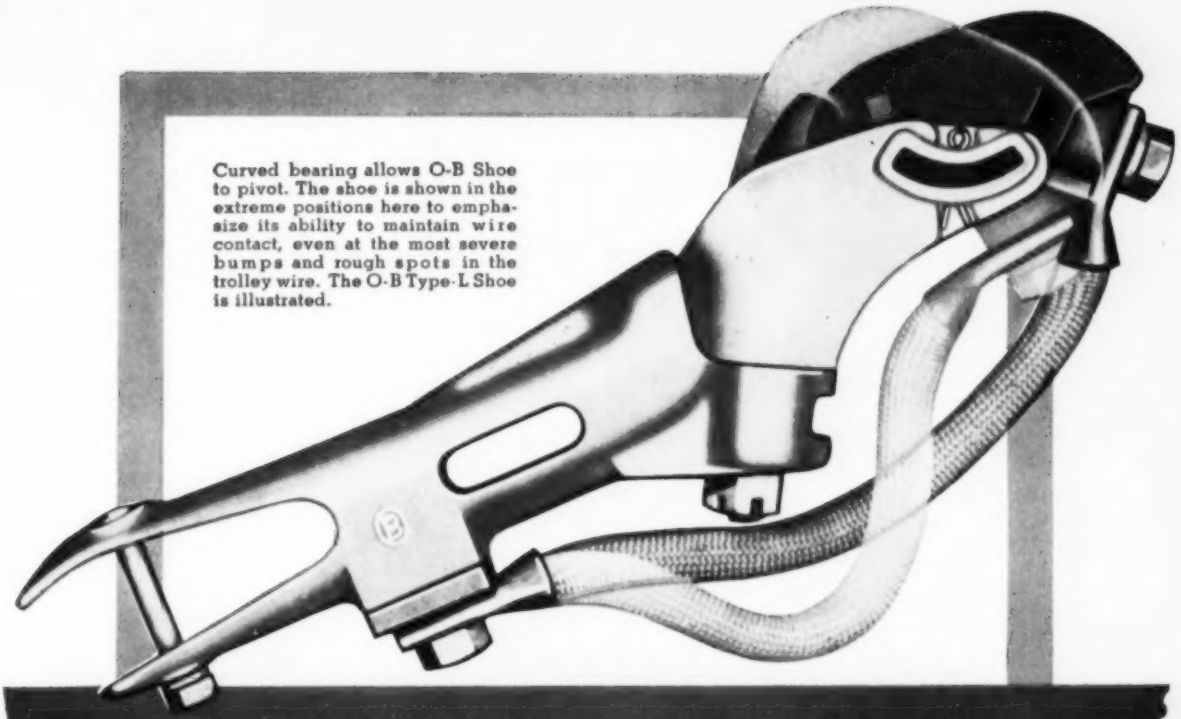
AT THE FRONTIERS OF PROGRESS YOU'LL FIND AIR REDUCTION PRODUCTS



Curved bearing allows O-B Shoe to pivot. The shoe is shown in the extreme positions here to emphasize its ability to maintain wire contact, even at the most severe bumps and rough spots in the trolley wire. The O-B Type-L Shoe is illustrated.

O-B Shoes Stop Dewirements and Wire Burning

because they HUG the wire!

Pivoting O-B Trolley Shoes give you these advantages — HIGH SPEEDS WITHOUT DEWIREMENTS — LONG LIFE FOR TROLLEY WIRE AND CURRENT COLLECTORS. Sounds worthwhile, doesn't it? Here's how they give you better collector performance:

O-B Trolley Shoes *pivot* at any bump or irregularity in the wire. Thus either the trailing end or the leading end of a shoe is always in contact with the wire as the shoe passes a jog. A wheel can be jarred hard enough by the same jog to make it lose contact. That causes dewirements. Shoes avoid that trouble by hugging the wire at all times.

When a collector breaks contact, there's some arcing and wire-burning. Metal burns away. Lumps appear on the wire and collector. Wheels bounce, arc, and burn at the least jounce. Shoes avoid that trouble by hugging the wire at all times.

Save wire and save collectors by switching to wire-hugging, burn-free O-B Trolley Shoes!

Ohio Brass

MANSFIELD OHIO, U. S. A.

4349-M

don't hitch hike

...ride a "JEEP"

The Lee-Norse TJ1 Mine Jeep gets you there safely! Here's the best answer for speedier underground transportation to and from working faces and emergency areas for mine superintendents, engineers, inspectors and maintenance personnel. A versatile performer the Lee-Norse Jeep can be used to pull man-trip cars, fire-fighting equipment and can be quickly placed in service as an ambulance. Detailed data available on request. Write now!

...ride a "SCOOTER"

No reason for mechanics, pumpers, fire bosses and other maintenance personnel to lose valuable time hitch-hiking when there is a Lee-Norse Scooter at hand. Weighing approximately 1000 lbs., the Scooter is popularly priced and its low-operating cost fits into every mine budget. The Scooter has a 48" wheelbase, is 9' in overall length and is available in all track gauges from 36" to 48". Where time is a factor the Lee-Norse Scooter is a "must". Send today for complete information and prices.

Lee-Norse Company
CHARLEROI, PA.

EQUIPMENT APPROVALS

Four approvals of permissible equipment were issued by the U. S. Bureau of Mines in January, as follows:

Joy Mfg. Co.—Type WK83R Model 190 mine-car compressor; one 50-hp motor, 500 v, AC; Approval 2-898A, Jan. 19.

Joy Mfg. Co.—Type 20BU-1-3E loading machine; two 15-hp and two 5-hp motors, 250 v, DC; Approval 2-899; Jan. 20.

Joy Mfg. Co.—Type DM8 "Drill-mobile" roof drill; one 75-hp and one 26-hp motor, 220 v, AC; Approval 2-900; Jan. 21.

Joy Mfg. Co.—Type 2WM-1E/F "Walking Miner"; two 65-hp and two 5-hp motors, 250 and 500 v, DC; Approvals 2-901 and 2-901A, respectively; Jan. 28.

Tennessee Mine Re-Opened By New Company

Acquisition of the Glen Mary mine of the Glen Mary Coal Co., Robbins, Tenn., by the newly formed Laddie Coal Mining Co. was announced last month. The mine, which had been closed for some time, is to be re-opened during March and capacity increased to 1,000 tpd. President of the new organization is Ray S. Walker, general manager of the Bradford Coal Co., Bigler, Pa. C. P. Saupt is general superintendent and Jack King is electrical engineer.

Union Colliery Leases *Terminal Site for New Mine*

The Union Colliery Co., St. Louis, will shortly begin development work on its proposed new mine in Gallatin County, Ill., it was reported Feb. 9 with the signing of a lease with the City of Shawneetown, Ill., for Ohio River frontage to be used for a coal-loading and shipping terminal. The mining company, which is a subsidiary of the Union Electric Co., is reported to have 8,000 acres of coal land under option in Gold Hill Township and to be assured of additional large acreage in Shawneetown Township. The proposed mine is expected to produce at least 1 million tons yearly, but neither its exact location nor the method of transporting coal from the portal to the river terminal has yet been released. The terminal site is leased for 50 yr, beginning Feb. 9, 1954.

Two Central Plants Handle Output From Lessees

The Jewell Smokeless Coal Co., Knoxville, Tenn., planned to open last month its new preparation plant at Whitewood, Buchanan County, Va., to clean and ship coal mined by lessees. The plant, which will ship via the N&W, will have a ca-

No. D3A500RM Male
& No. D3A500RF Female
Plugs Illustrated

for peak production
SECTIONALIZED CABLE WITH JOY (SPB) PLUGS

BULLETIN
No. B39a

Modern mining schedules allow little time for cable repair or replacement. That's the reason why more and more portable power feeders are being *sectionalized* with JOY SPB (Straight Pin Bigun) Connectors. Cable so sectionalized can be quickly lengthened or shortened through addition or deletion of sections . . . and damaged sections can be easily replaced. This cuts "down-time" to a minimum and increases production.

JOY Straight Pin Bigun Connectors are built for rough mining service. Equipped with threaded couplings and the famous JOY two-way water seal, they can't be surpassed for performance, safety and durability . . . and because they're molded to cable as one-piece neoprene units, they're shatter-proof, wear-resistant and highly impervious to the deteriorating effects of moisture, grease or oil.

JOY SPB plugs are available for A.C. or D.C. operation in a wide variety of conductor combinations and current capacities. ● For more detailed information, ask for your copy of Bulletin B39 A. You'll be glad you did! ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.,*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

Consult a Joy Engineer

W&D M 4539

JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

WITH STEARNS MAGNETIC PULLEYS

TRAMP IRON YOUR HEADACHE?

TAKE YOUR COST-CUTTING CUE FROM STEARNS MAGNETIC EQUIPMENT...

Avoid costly damage to crushers, grinders, screens and other expensive equipment by using a STEARNS Electro or Permanent Magnetic Pulley.

HANDLING run of mine coal at the rate of 350 tons per hour, this STEARNS Magnetic Pulley protects expensive crushers and screens by continuous and automatic tramp iron removal. If you want to reduce shut-down time and keep repair charges to a minimum — install a STEARNS Magnetic Pulley, the only economical and effective insurance against the tramp iron nuisance.

WHETHER your problem is the fairly simple job of tramp iron removal or the concentration and beneficiation of complex ores, STEARNS has EXPERIENCE ENGINEERED equipment to meet your specifications.

For a thorough investigation of your separation problem, STEARNS offers complete laboratory research facilities. Write today for details on testing of sample material.

STEARNS MAGNETIC EQUIPMENT FOR EVERY MINE

LARGEST!

● Whether your needs are large or small, STEARNS has an electro or permanent magnetic pulley for you. Here's the World's Largest Electro-Magnetic Pulley — 60 inches in diameter, 36 inches wide.

SMALLEST!

● This is our smallest standard pulley; 12 inches high, 12 inches wide. Write for descriptive literature.

Foremost in the Magnetic Field

Stearns MAGNETIC INC.

661 South 28th Street, Milwaukee 46, Wisconsin

pacity of 1,000 tpd, making a wide range of sizes to be marketed under the trade name of Garland Jewell. In Pennsylvania, the Dixonville Coal Co., Johnstown, has under construction its new Randolph No. 2 cleaning plant at Dixonville, Indiana County. The plant will include a Neldco heavy-media washery and will have a capacity of 1,500 tpd, shipping via the Pennsylvania R.R. Coal will be supplied by various lessees on company-owned property mining the B, or Miller, and D, or Moshannon, seams.

Hanna Coal Starts Surveys Of Large West Virginia Tracts

The Hanna Coal Co., Div. of Pittsburgh Consolidation Coal Co. early this year started an engineering survey of large coal holdings in Marshall and Wetzel counties, West Virginia, preparatory to development for supplying large tonnages to the Ohio Valley Electric Corp., which is to supply power for the new AEC plant to be built in Ohio. Actual deliveries under the contract are not scheduled to begin until the fall of 1954. Tunneling underneath the Ohio River to facilitate deliveries, as indicated in some reports, was termed "most unlikely" by a company official. Late in January, the acquisition of some 19,000 acres of coal land in the Liberty and Meade districts of Marshall County was reported with the recording of deeds. The property was acquired in four deeds, at a reported price of about $9 an acre.

And For Your Information . . .

The Hetzel mine of the Georges Creek Coal Co., Hetzel, Logan County, W. Va., has been acquired by the Crystal Block Coal & Coke Co. No major changes in operation or personnel are reported.

Paradise Collieries Co., Muhlenberg County, Kentucky, was scheduled to begin coal shipments in mid-February. The new operation, a joint venture of the West Virginia Coal & Coke Co. and the Pittsburg & Midway Coal Mining Co., is expected to produce 1 million tons annually when in full operation.

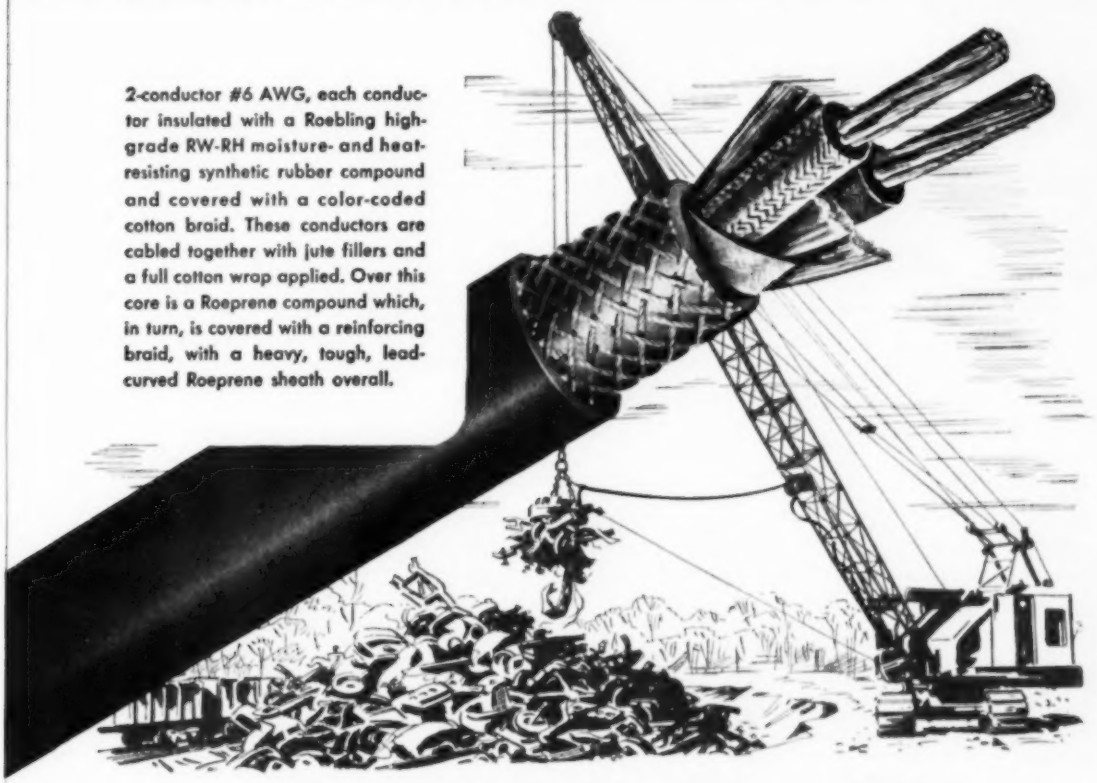
The Phoenix Park colliery, Minersville, Pa., closed since 1950, reportedly will be re-opened by the Phoenix Park Coal Co., headed by Lawrence Bisconti.

Pierce Management, Inc., Scranton, Pa., announced Feb. 10 that it had contracted with the government of the Union of Burma for drilling and exploration work on the Kalewa coal property and that four of its engineers would shortly leave for Burma to execute the program. Pierce engineers also are in charge of a Viet-Nam government survey of American stripping methods and are conducting four Viet-Nam engineers on a tour of various mining fields.

The U. S. Steel Co. put into operation Jan. 29 the first of three coke-oven bat-

ROECLAD PORTABLE POWER CABLES

2-conductor #6 AWG, each conductor insulated with a Roebling high-grade RW-RH moisture- and heat-resisting synthetic rubber compound and covered with a color-coded cotton braid. These conductors are cabled together with jute fillers and a full cotton wrap applied. Over this core is a Roeprene compound which, in turn, is covered with a reinforcing braid, with a heavy, tough, lead-curved Roeprene sheath overall.



Roebling Roeclad Lifting Magnet Cables outlast all others 2 to 1

Roebling Roeclad Lifting Magnet Cable is engineered and produced to withstand rough treatment and to give long service life. The design of this cable is based on field experience of more than 30 years.

Exhaustive tests performed in Roebling laboratories to prove the superiority of Roeclad Lifting Magnet Cables included fatigue and impact tests of representative samples.

In a fatigue test, cable samples after being subjected to more than 2,000,000 reversals—half at room temperature and half at 0°F.—showed no damage to either of the two conductors.

In impact tests, it required over 3000 blows of a 20-lb. weight dropped 5½ inches, 25 times per minute, to cause failure of a two-conductor #8 AWG Roeclad Lifting Magnet Cable.

And a report from an engineering company which has a large number of machines equipped with magnets is typical of the entire field... that Roeclad Lifting Magnet Cable out-performs competitive cables by at least 2 to 1.

Through unending research and development, Roebling's complete electrical line is constantly being improved. You can always buy Roebling with assurance of top efficiency and economy. John A. Roebling's Sons Corporation, Trenton 2, N. J.

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All four of these mining problems were economically solved with Armco Liner Plates. On a pound for pound basis these plates cut costs while improving safety and efficiency.

Costs are lower because of easy installation. Corrugated metal design of Armco Liner Plates provides safe strength with less weight and material. This means that one man can carry, hold and bolt an Armco Liner Section into place. Tightening bolts with a structural wrench is done inside the structure. Work goes on smoothly, quickly with unskilled labor.

Other advantages you will like include fire-resistance and freedom from excessive maintenance.

With the wide range of diameters and gages available, you can find the right size of Armco Liner Plates to meet your particular mining needs. Write for details. Armco Drainage & Metal Products, Inc., 2133 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. Export: The Armco International Corporation.

Armco Liner Plates

ARMCO

Mine Entries

Bins

Overcasts

Shafts

teries scheduled for completion in 1953 at its Clairton, Pa., works. The No. 14 battery, constructed by Koppers, has 61 ovens using 1,400 tons of coking coal daily. No. 13 battery is scheduled for completion during February and No. 15 is slated for May.

High operating costs, plus poor market conditions in some areas, were cited in the announcements of various mine closings last month. High costs of production were cited by the Philadelphia & Reading Coal & Iron Co. for the scheduled closing March 15 of its Knickerbocker colliery, employing 865 men. In the closing Feb. 16 of its No. 8 mine at Jenkinjones, W. Va., the Pocahontas Fuel Co., Inc., blamed "market conditions." The mine employs 500 men and produced almost a half-million tons in 1952. The Norfolk & Western Ry. reported that it would close its Howard Colliery at the end of February because the long haul to the tipple and the grade of coal made the operation uneconomic. In Kentucky, the Southern Mining Co. expected to close its mine at Colmar, Ky., because of high labor costs and poor markets, but planned to continue its other two mines in operation.

Preparation Facilities

Truax-Traer Coal Co., Velva, N. D.—Contract closed with McNally Pittsburg Mfg. Corp. for lignite coal preparation plant, including facilities for receiving R-O-M lignite, reducing to 8 x 0, and conveying to plant at 560 tph; coal to be classified into 8 x 5, 5 x 3, 3 x 1½, and 1½ x 0, with blending and crushing facilities for reducing all 3-in material to minus 3½, with rescreening equipment.

United States Steel Corp., Robena slope mine, Poland, Greene County, Pa.—Shipment by Deister Concentrator Co. of eight SuperDuty Diagonal-Deck No. 7 coal-washing tables for cleaning ¾ x 0 coal, making a total of 24 shipped.

South Union Coal Co., No. 11 mine, Edna, W. Va.—Shipment by Deister Concentrator Co. of one SuperDuty Diagonal-Deck No. 7 Model HCRD coal-washing table.

Harmar Coal Co., Harmarville, Pa.—Shipment by Deister Concentrator Co. of four Concenco Model 108-B revolving feed distributors for feeding 24 SuperDuty Diagonal-Deck No. 7 coal-washing tables.

Stonega Coke & Coal Co., Appalachia, Va.—Shipment by Deister Concentrator Co. of one Concenco Model 108 revolving feed distributor for feeding four SuperDuty Diagonal-Deck No. 7 coal-washing tables.

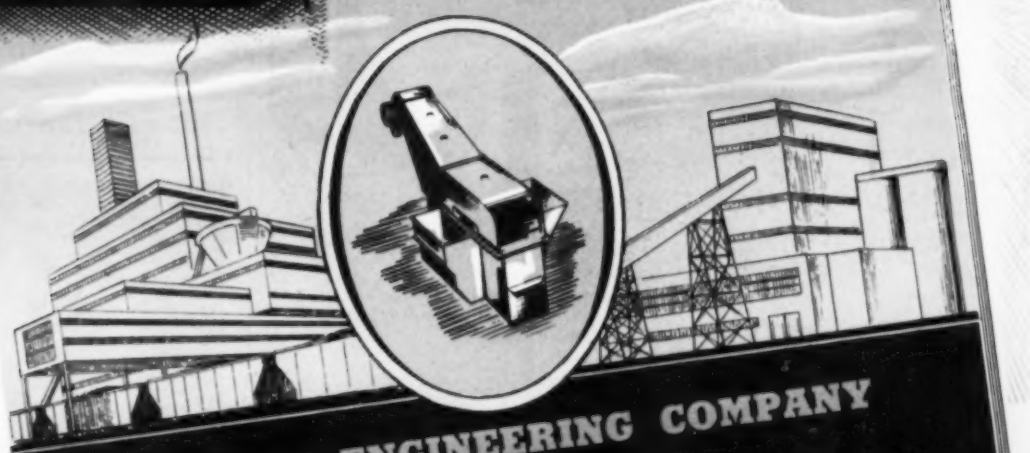
United States Steel Corp., Alpheus plant, Gary, Pa.—Shipment by Deister Concentrator Co. of one Leahy heavy duty vibrating screen equipped with FlexElex unit for electrically heating screen cloth.

BULLETIN HD-521

WILMOT-DANIELS HEAVY DENSITY SYSTEM

For Coal Cleaning and Ore Concentration

Send for
BULLETIN
on this New Development in Heavy Media



WILMOT ENGINEERING COMPANY

HEAVY DENSITY DIVISION

Designers • Engineers • Manufacturers

MAIN OFFICE—HAZLETON, PA.

PLANT—WHITE HAVEN, PA.

The revolutionary advances in heavy media effected by the new Wilmot-Daniels System are suggested by the following: (1) Solves two most common heavy-media problems, fluctuation of bath density and loss of product to refuse. (2) Requires 50% less floor space. (3) Contains 5 less major parts and 4 less motors. (4) Employs many standard parts for greater ease of maintenance. (5) Custom-made to fit floor space. For complete details of how the Wilmot-Daniels System is cutting costs for coal and metal producers see Bulletin 521.

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HEAVY DENSITY DIVISION
Wilmot Engineering Co.
Markle Bank Bldg., Hazleton, Pa.

Sign Tear Out Mail

Send us Bulletin 521 on new Wilmot-Daniels Heavy-Density System for coal cleaning and ore concentration.

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Company _____

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MINERAL AND COAL CLEANING EQUIPMENT

New SIMPLEX Mine Timber Jack that's Geared for Speed

SIMPLEX
No. 642
Geared
Screw Type
MINE TIMBER
JACK

5 MODELS
Capacity: 6 tons
Heights: 3'-6" to 6'-6" closed; 5'-6" to 9'-6" extended
Weights: 47 to 62 lbs.

Here's a new geared-screw type Timber jack that's twice as fast as conventional screw types. It's easy to handle and economical for cross timbering with wood or steel, or as a safety prop under doubtful roof conditions. Its rotating head permits closer positioning to any vertical setting or rib. And it doubles as a maintenance jack for locomotives and cars when used in a pit.

The Simplex No. 642 features all the strength, durability and built-in safety for which Simplex is noted. Full six-ton capacity. Write today for full information.

SIMPLEX 84A, 85A, 86A Ratchet Lowering Jacks
Designed especially for thin, normal and thick seam work in coal mines. Ideal for lifting, moving mine machinery, track work, re-railing locomotives. 5-ton capacities.

WORLD'S LARGEST MFGRS. OF INDUSTRIAL MECHANICAL AND HYDRAULIC JACKS

SIMPLEX
RE-MO-TROL UTIL-A-TOOL **JACKS** JENNY ROL-TOE

TEMPLETON, KENLY & COMPANY
1040 South Central Avenue • Chicago 44, Illinois

PERSONALS . . . From p 138

gineer of the Clinchfield Coal Corp., Dante, Va., succeeding **A. E. Flowers,** who joined the staff of *Coal Age* as assistant editor last fall. **Luther E. Allen,** superintendent of supplies, has been appointed production engineer at Clinchfield. **Emerson Fleming,** formerly chief supply clerk at Moss mine, has been made superintendent of supplies, to succeed Mr. Allen.

Arthur Belton, associated with Consolidation Coal Co. (W. Va.), Fairmont, W. Va., since 1944, has resigned to join the Imperial Coal Corp., Johnstown, Pa., as assistant general superintendent.

William Robinson has been promoted to chief electrician of the western Kentucky properties of the Bell & Zoller Coal & Mining Co., succeeding **William McGregor,** recently advanced to general superintendent. Mr. Robinson, who has been with Bell & Zoller for 4 yr, formerly was in charge of mechanics and electrician on the third shift.

Hodge Burress, for the past 10 yr superintendent of the Hanna No. 4 mine of The Union Pacific Coal Co., Hanna, Wyo., retired last month, according to an announcement by V. O. Murray, vice president in charge of operations. **Julius Reuter,** formerly assistant superintendent, was named to succeed Mr. Burress.

Obituaries

Howard Eavenson, 79, head of the mining engineering firm of Eavenson & Auchmuty, died Feb. 16 at his home in Pittsburgh, Pa. A graduate of Swarthmore College in 1892, with a degree in civil engineering in 1895 and a University of Pittsburgh doctorate in engineering in 1928, Mr. Eavenson joined H. C. Frick Coke Co. and allied concerns in 1897 as divisional engineer, and advanced to chief engineer at Uniontown, Pa. From 1902 to 1920 he was chief engineer for the United States Coal & Coke Co. at Gary, W. Va. A construction engineer and mining consultant since 1920, Mr. Eavenson was a past president of Bituminous

New Sinclair Grease for Heavy Duty Equipment

Tests prove New Grease Gives better Lubrication... Longer Life to Bearings

A new Sinclair grease with superior lubricating qualities for bearings of heavy duty equipment is now available. Sinclair HEAVY DUTY BEARING GREASE is specially compounded to *stay put* in heavily loaded, slow speed rotating or sliding bearings.

New Sinclair HEAVY DUTY BEARING GREASE has an exceptionally high load-carrying capacity... greater resistance to pounding and shock loads... greater resistance to melting out. Operators of power shovels, draglines, tipples, conveyors and all other heavy duty equipment are assured of longer bearing life... higher productivity... lower operating costs.

Sinclair HEAVY DUTY BEARING GREASE is available in three grades – "0," "1," and "2." It is easily applied with a hand gun or air gun. It comes in 35 pound pails and 100 and 400 pound drums.

A Sinclair Lubrication Engineer can give you expert counsel on how you can get the most out of Sinclair's new HEAVY DUTY BEARING GREASE. Phone your local Sinclair Representative or write to Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.

SINCLAIR HEAVY DUTY BEARING GREASE

Under normal roof conditions, suspension bolts of the wedge or expansion sleeve type can do an excellent job in reducing costs.

West Virginia makes roof bolts of the wedge stud type, the expansion sleeve stud type and the expansion sleeve bolt type which may be used under varying mining conditions. The use of these roof bolts makes possible the removal of timber, prop and cross bar obstructions and enables the movement of men and machines to be speeded up.

West Virginia also makes prefabricated track which can be quickly installed and easily moved as working areas progress. Prefabricated track makes it possible to keep good track up to the working faces at a low labor cost and helps make possible the movement of large quantities of coal speedily and economically.

We manufacture all parts required in a complete mine track installation. Good stocks of standard items of roof bolts, washers, rails and accessories, switches, switch stands and mine ties. Write for more complete information today.

Manufacturers of prefabricated track, rail benders, slate bars, switches and turnouts and other mining products

WEST VIRGINIA STEEL & MFG. CO.

HUNTINGTON, W. VIRGINIA

Coal Research, Inc., and was a director of the Boone County Coal Corp. and Appalachian Coals, Inc. In 1947, Mr. Eavenson received the Perry Nicholls Medal for achievement in mining, and the American Institute of Mining and Metallurgical Engineers awarded him the Legion of Honor certificate for 50 yr of service in the coal mining industry and the William Lawrence Saunders Medals for his achievements.

Fred Schaefer, 63, president, Pekin Coal Mining Co., Pekin, Ill., died Feb. 5. He was also president of the Jansen & Schaefer Construction Co. in Pekin.

Howell J. Davis, 78, president of East Tennessee Coal Co. and vice president of Volunteer Portland Cement Co., died Jan. 28 of a heart attack following a prolonged illness, at his home in Knoxville, Tenn. Active in local government, Mr. Davis served on the Knox County highway commission for 13 yr. His brother, W. E. Davis, president of Old-King Mining Co. and Kentucky Sun Mining Co., Tribbey, Ky., was honored in *Coal Age's* "Half Century Club" (Jan., p 102).

Benton Briggs Holt, 75, retired since 1949, died Jan. 21, at Muhlenberg Community Hospital, Greenville, Ky., after a long illness. He organized Holt Brothers Mining Co., which operated the Gibraltar Coal Co., Fort Hartford Coal Co., Hartford, Ky., and Holt Brothers Mining Co., McHenry, Ky. Mr. Holt was a director of the First National Bank, Central City, Ky., for 45 yr.

John J. Chulick, 43, general outside superintendent, John Conlon Coal Co., Hudson, Pa., died Jan. 29 of a heart attack, at his home in Hanover Township, Pa. Mr. Chulick, who joined the company 30 yr ago, began working as a truck helper at the age of 13.

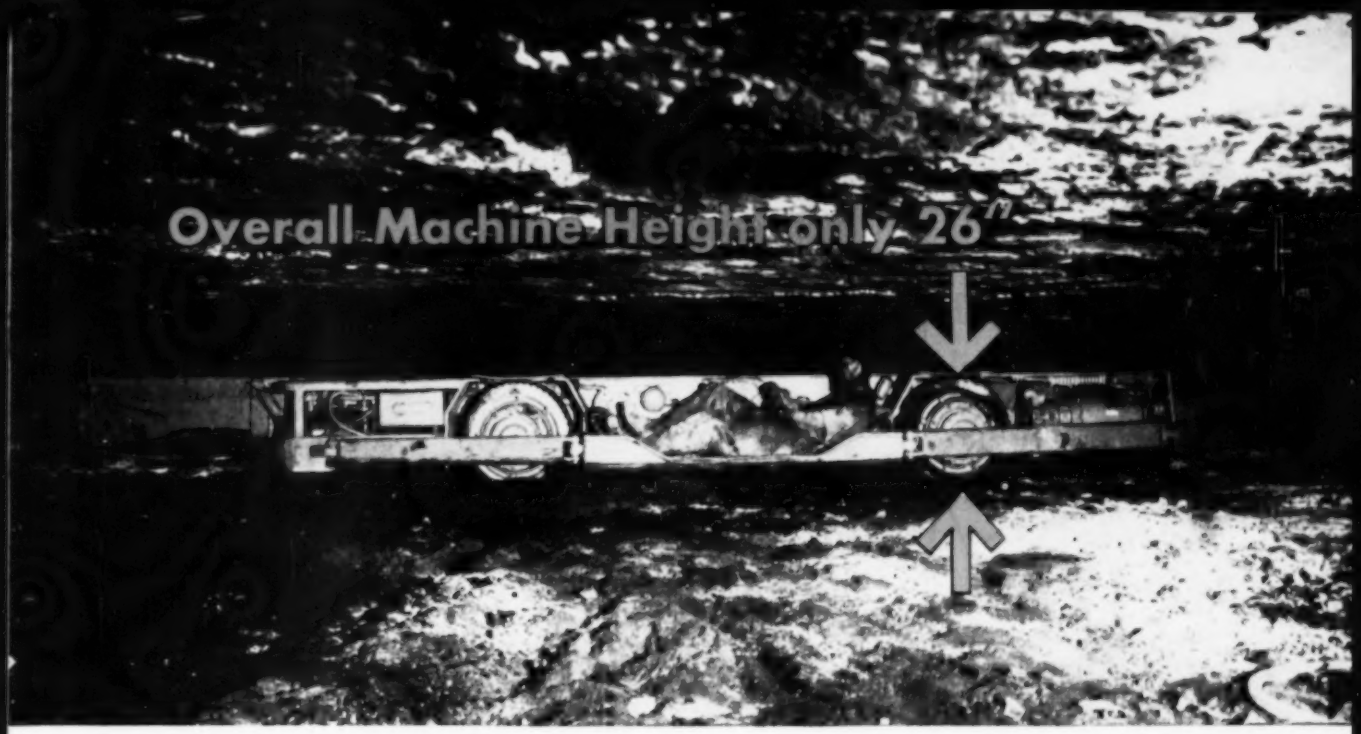
Association Activities

No. W. Va. Coal Group Meets

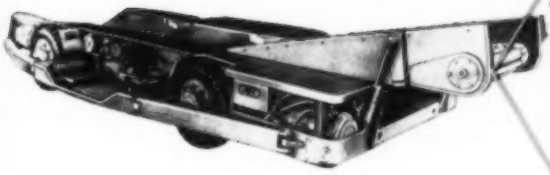
At the annual meeting of the Northern West Virginia Coal Association, Jan. 23, at Fairmont, W. Va., special talks were given on the federal mine safety act, stream pollution and freight rates, in addition to the election of officers, as follows: George Higinbotham, president; J. F. Trotter, A. R. Reppert and Joseph McQuade, vice presidents; and T. E. Johnson, secretary-treasurer. George S. Brackett, who has served as president for a number of years, resigned because of ill health, but will continue as labor consultant for the group.

Coal Lessors Hold Meeting

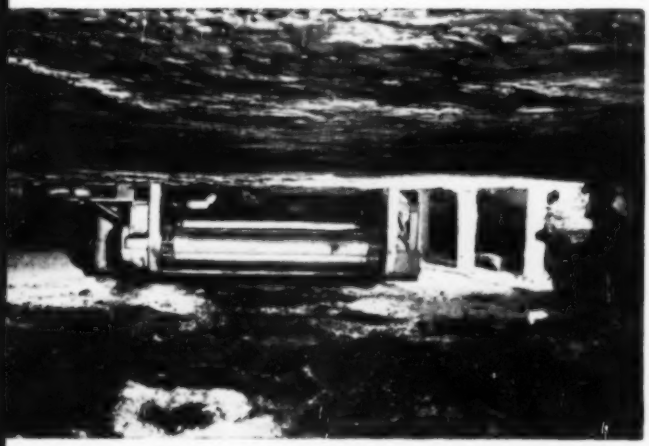
The National Council of Coal Lessors, at its annual meeting in Washington, elected the following directors for 1953: S. T. Brown, Rolla D. Campbell, Roger F. Cooper, Robert M. Fisher, J. M. B. Lewis Jr., and J. G. Puterbaugh. Current officers of the group are: Mr. Cooper, president; Mr. Campbell, vice president; Mr. Lewis, secretary; and Mr. Brown, treasurer.



When you're looking for dependable, high-tonnage hauling in very low coal . . .



The 8-SC SHUTTLE CAR *is YOUR VERY BEST BET!*



Only 26" high, the 8-SC Shuttle Car has a level capacity of 2 tons. With the 12-RB Cutter (26" high) and the 20-BU-1 Loader (24" high), it constitutes the first high-capacity mechanized mining team for very low coal. Other Joy equipment for any mining need.

The 8-SC is highly maneuverable and flexible—it loads, unloads and gets back again fast and dependably . . . *and that's what keeps costs down and tonnage up!*

Features include: 4-wheel positive drive, 4-wheel brakes and 4-wheel steering, with a wider, tapered-end design that permits minimum turning clearance. Controls are centrally located; the operator has equal visibility in either direction. Separate motors for traction, conveyor drive and hydraulic pump drive. Hydraulic cable reel; hydraulically-adjustable elevating discharge. ● For full data, address ***Joy Manufacturing Company, Oliver Bldg., Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ont.*

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WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

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Here's a free brochure on Triangle Plastic Pipe. It contains all the most recent information on how Triangle's four types—Flexible, Semi-Rigid, Rigid High Impact and Rigid Polyvinyl Chloride—can help solve your piping problems.

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It Must Be Right

Mingo County Institute Picks Officers

NEW OFFICERS installed Jan. 16 at a dinner meeting of the Mingo County Mining Institute at the Mountaineer Hotel, Williamson, W. Va. were: president, A. E. McClellan (left), general mine foreman, Howard Colliery, Norfolk & Western Ry. Mining Dept.; vice president, T. C. Hamill, assistant general manager, Sycamore Coal Co.; and secretary-treasurer, John Zsoldos, safety inspector, Howard Colliery. As a departure from regular practice, the ladies were present, "to learn what their husbands do at institute meetings."

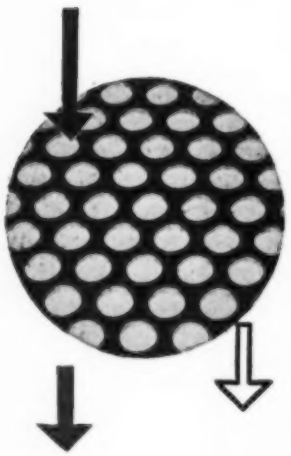
NCA Education Group Meets At University of Kentucky

Inspection of instruction laboratories in coal carbonization, coal preparation and ore dressing and announcement of two new plans for education in coal highlighted the meeting of the National Coal Association's Education Committee at the University of Kentucky, Lexington, Jan. 16-17.

The nine coal men who gathered in Lexington heard the president and faculty members describe in-residence and ex-

In Coal Preparation

it's the SIZE that counts!



You can rest assured your material will be accurately sized if you use Hendrick Perforated Plate on vibrating and shaking screens. With Hendrick Perforated Metal Plate, screens last longer, openings remain uniform under constant, heavy-duty usage.

Delays due to costly blinding are reduced to an absolute minimum — decks can be changed easier, faster—and downtime for repairs is practically eliminated — when Hendrick Perforated Plate is used.

Available flat, corrugated or stepped with any desired shape and size of perforation in proper gauges of regular, high carbon, and high tensile steels and in other commercially rolled metals. Write for more details.

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41 DUNDAFF STREET, CARBONDALE, PA.
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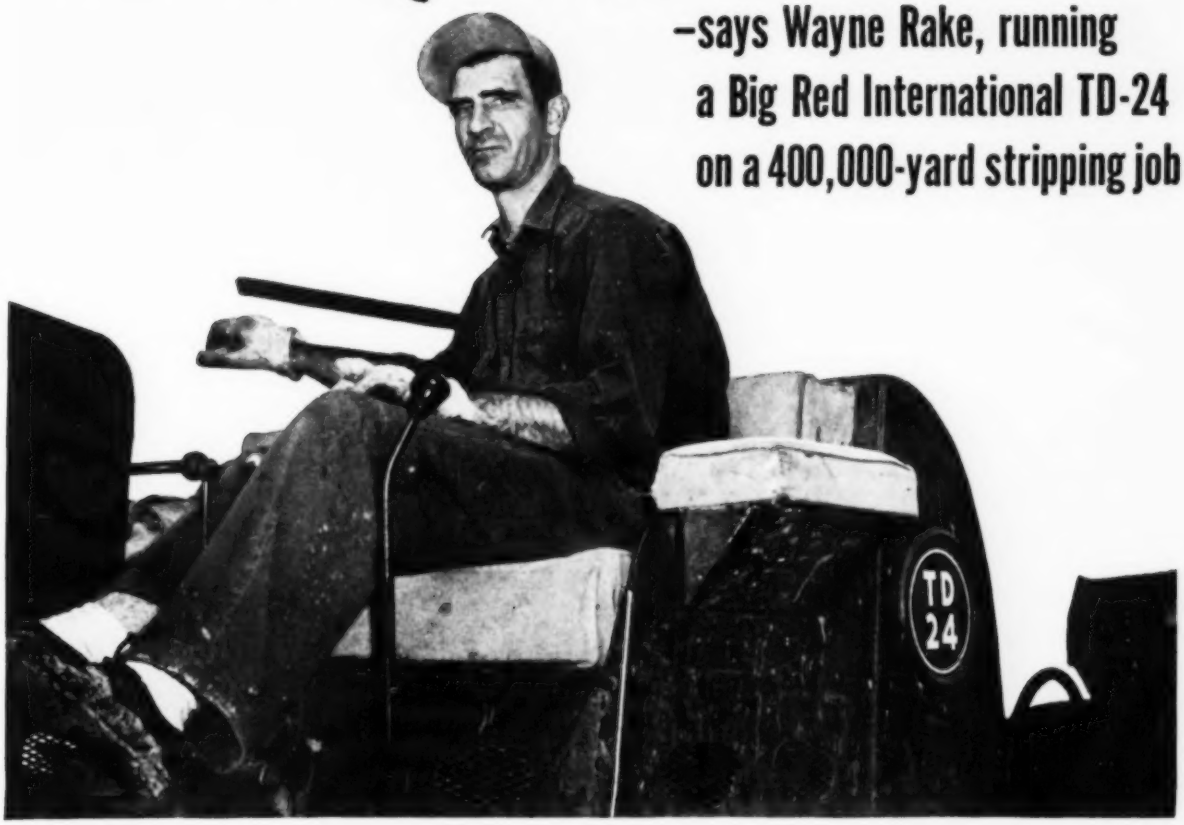
PERFORATED METAL • PERFORATED METAL SCREENS • WEDGE-SLOT SCREENS
ARCHITECTURAL GRILLES • MITCO OPEN STEEL FLOORING • SHUR-SITE TREADS • ARMORGRIDS

"It's the Operator's Crawler"

–says Wayne Rake, running a Big Red International TD-24 on a 400,000-yard stripping job



Contractor Hilding Ekdahl of Fort Dodge, Iowa, is working three International TD-24s top speed at a U. S. Gypsum quarry. One hundred feet of waste and overburden covering a 20-foot vein of pure gypsum is being removed.

On substantial earthmoving jobs like this, operators who like their crawlers can make a big difference in the final net profit figure.

Just listen to what one of Ekdahl's operators, Wayne Rake, has to say about his TD-24:

"This TD-24 with its turns with power on both tracks, is the easiest-operating crawler for any skinner. I can load more dirt faster and make the delivery haul quicker than with any other crawler I ever operated. It's definitely an operator's crawler."

For more facts and figures on remarkable TD-24 performance that makes it the operator's pet, see your International Industrial Distributor. You'll be a TD-24 man from then on in!

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS

BIGGER PAYLOADS PAY OFF. International TD-24 and scraper strip heaping loads fast to get at pure gypsum underneath.

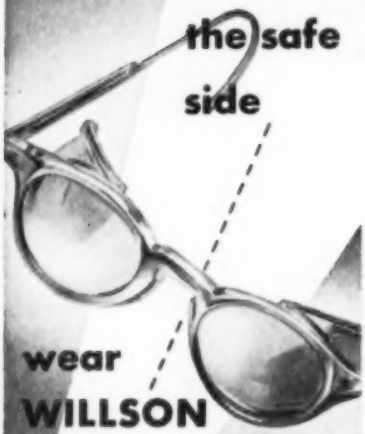
INTERNATIONAL HARVESTER

INTERNATIONAL

POWER THAT PAYS

WILLSON
dependable
eye protection

keep on the safe side



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Combined protection, comfort and appearance make Willson safety spectacles outstanding in value. Choose from a full range of metal and plastic frames—fitted with Super-Tough* heat-treated glass lenses, or Plas-Tough* plastic lenses—every one tested for impact resistance and optical quality. Send for catalog describing our complete line of safety equipment.

STYLE AH

METAL FRAME Latest style spectacle with single bridge. Have Hi-Line temples with a "dressy" look. Also available with sideshields. (Non-flammable plastic frame Style WKS shown at top.)

CHOOSE YOUR FAVORITE LENSES FOR ANY WILLSON SPECTACLES

Super-Tough* Plas-Tough* Willsonite*

Three popular types of lenses are available for all Willson Spectacles. Clear glass Super-Tough*, Willsonite* Green Super-Tough* and the new Plas-Tough* lenses that combine the impact resistance of heat-treated glass with the comfort of lightweight plastic.

*Trademark

See your Willson distributor or write for Catalog

WILLSON PRODUCTS, Inc.
239 Washington Street, Reading, Pennsylvania

COAL MEN ON THE JOB

OFFICIALS OF THE APPALACHIAN CHAPTER of the West Virginia of Society of Professional Engineers include mining and electrical engineers from the Beckley, W. Va., area. Officers shown here are: president, J. P. Hindsley (front, left), sales lubrication engineer, Gulf Oil Co.; director, William Marrata, assistant manager, Lillybrook Coal Co.; secretary-treasurer, L. G. Fitzgerald, mining engineer, USBM; director, J. E. Howard, chief engineer, The New River Co.; director, Paul R. Maxey (rear row, left), chief engineer, Mining Div., Armco Steel Corp.; vice president, John C. Morton, sales lubrication engineer, Socony Vacuum Oil Co.; past president, C. C. Darrah, electrical engineer, Appalachian Electric Power Co.; and vice president, B. B. Corker, electrical engineer, Appalachian Electric Power Co.

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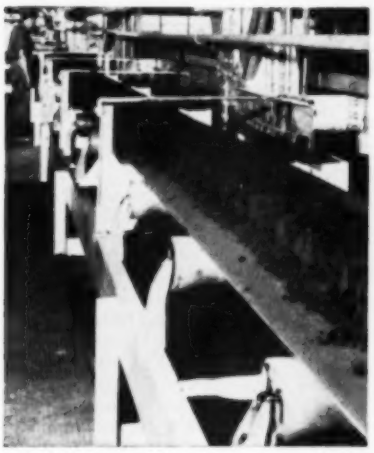
- For joining underground extension conveyors.
- A FLEXCO fastener that is HINGED. Has removable hinge pin.
- Troughs naturally, operates smoothly through take-up pulleys.
- Strong, durable . . . pull or tension is distributed uniformly across joint.
- For conveyor belts ⅛" to ½" thick.

Order From Your Supply House. Ask for Bulletin HF 500.

FLEXIBLE STEEL LACING CO. 4638 Lexington St., Chicago 44, Ill.

For long-lived, heavy-duty conveyors...



This 216-foot conveyor has been transporting prepared foundry sand since 1946 at the rate of 50 tons per hour. Timken bearings in the Bartlett and Snow Company idlers assure users of maximum bearing capacity and long life.

A Maine contractor moved an average of 1300 tons of crushed stone and gravel a day on this 95-foot conveyor manufactured by the Pioneer Engineering Works. With Timken bearings in the idlers, longer life and minimum maintenance are assured.

This installation that hauls from mine to stock pile, built by the Chain Belt Company, is 2500-feet long, 30 inches wide, moves at 500 feet per minute. Timken bearing equipped idlers carry the loads with minimum friction.

IT'S TIMKEN®... AND TIMKEN... AND TIMKEN AGAIN!

AND HERE ARE 6 BIG REASONS WHY:

1. **THOROUGHLY PROVED.** The Timken® bearing is the only tapered roller bearing proved by 15 years or more of service in heavy-duty conveyor installations using the popular dead shaft construction.

2. **EXTRA CAPACITY.** Line contact between rollers and races gives Timken bearings high load capacity. And by using Timken bearing sizes that are mass produced for the automotive industry, you get extra-capacity bearings that actually cost less than the smaller sizes you'd normally use.

3. **LONG-LIFE LUBRICATION.** Not just lubricated for "life" but lubricated yearly, or as conditions require, to insure long life. Fresh lubricant ends any chance of gummy, sticky, jammed bearings.

4. **LONGER ROLLER AND BELT LIFE.** Less sliding and scuffing between idlers and belt.

5. **FRICTION MINIMIZED.** Timken bearings' true rolling motion and extremely smooth surface finish practically eliminate friction.

6. **MAINTENANCE REDUCED.** Long life and dependable performance of Timken tapered roller bearings cut maintenance to a minimum.

Remember, "Timken" is not a bearing type. It is a trademark applying to bearings made by The Timken Roller Bearing Company. Always insist on Timken bearings in the conveyors you build or buy. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

Wherever the going's tough industry turns to

TIMKEN

TAPERED ROLLER BEARINGS

Typical application of Timken bearings for conveyor idlers.

NOT JUST A BALL — NOT JUST A ROLLER — THE TIMKEN TAPERED ROLLER — BEARING TAKES RADIAL AND THRUST — LOADS OR ANY COMBINATION

STOP *Pumping Troubles*
CUT *Maintenance Costs*
AVOID *Costly Shut-downs*

GORMAN-RUPP PUMPS SAVE MONEY

Pumping troubles are greatly reduced and 40% of costs saved with the increased efficiency of the GORMAN-RUPP design. 3 H.P. does what formerly required 5 H.P.

Maintenance problems are minimized due to the extreme simplicity of design — the impeller is the only moving part. Any wearing parts are quickly and easily replaced with common tools. Pumps are furnished bronze fitted, and of all-bronze construction.

Costly shutdowns are practically eliminated. Gorman-Rupp pumps run indefinitely, with little or no attention. Automatically self-priming — ideal for remote location and control, these pumps require very low headroom, are efficient, reliable, and maintain nearly normal capacity under any working head.

All GORMAN-RUPP pumps are **guaranteed** in plain language.

Write for Bulletin No. O-ME-11

FOR STRIP MINE WATER HANDLING

GORMAN-RUPP centrifugal pumps will handle the toughest jobs, no matter how large a volume of water. They will **prime faster, higher and pump more dirty water** than any other pump of comparable size. Self-priming centrifugal pumps range in capacity from 1½-inch, 5,500 G.P.H., to the powerful 10-inch, pumping 240,000 G.P.H.

WRITE US ABOUT YOUR PUMPING PROBLEMS

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Buckeye Machine Supply Co., New Philadelphia, Ohio
Bluefield Supply Co., Bluefield, W. Va.
Cambridge Mach. & Supply Co., Cambridge, Ohio
Central Mine Supply Co., Mt. Vernon, Illinois
Central Mine Supply Co., Madisonville, Ky.
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General Machinery Co., Birmingham, Alabama
Guyan Machinery Co., Logan, W. Va.
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Johns Equipment Co., Ft. Wayne, Indiana
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Mine Service Co., Lothair, Ky.
Reliable Electric & Equip. Co., Zanesville, Ohio
Superior Sterling Co., Bluefield, W. Va.
Tennessee Mill & Mine Supply Co., Knoxville, Tenn.
West Virginia Pump & Supply Co., Huntington, W. Va.
Weinman Pump & Supply Co., Pittsburgh, Pa.

THE GORMAN-RUPP COMPANY
306 BOWMAN STREET, MANSFIELD, OHIO

tension courses in mining, metallurgical, electrical, civil and mechanical engineering and in geology.

M. D. Cooper, NCA director of mining-engineering education, told of two new plans recently launched. One plan, offered by the University of Pittsburgh, provides mining-engineering instruction on a part-time basis for students who are regularly employed by coal companies. The other, offered by the University of Illinois, is a course in fuel technology, set up as a fifth year for engineering graduates and leading to an M. S. degree.

H. C. Woods, committee chairman and chairman of the board, Sahara Coal Co., invited attention to a 2-wk course in coal salesmanship to be offered in June, 1953, at Pennsylvania State College.

Coal men attending the meeting, in addition to Mr. Woods and Mr. Cooper, were: S. B. Johnson Jr., Lorain Coal & Dock Co.; R. C. Luther, Peerless Coal & Coke Co.; Davis Read, consulting engineer; W. J. Schuster, Hanna Coal Co.; F. F. Stewart, Jewell Ridge Coal Corp.; Tom Pickett, National Coal Association; and Dr. M. Edmund Speare, Bituminous Coal Institute.

Cooley Heads Western Group

The Colorado-New Mexico coal Operators' Association has named Lester M. Cooley, managing partner of the Edna Coal Co., president. Other officers elected by the association include: J. R. Kastler, first vice president; Walter Johnson, second vice president; and Oren F. Bridwell, secretary-treasurer.

Kanawha Valley Elects

At the annual meeting of the Kanawha Valley Mining Institute, Montgomery, W. Va., Jan. 9, the following officers and directors were elected for 1953: president, J. A. Wallis Jr., vice president, Coalburgh-Kanawha Mining Co., Coalburg, W. Va.; first vice president, W. B. Devaney, comptroller, Cannelton Coal & Coke Co., Cannelton, W. Va.; second vice president, H. A. Jones, general superintendent, Carbon Fuel Co., Carbon, W. Va.; third vice president, M. L. Alley, general manager, Gauley Mountain Coal Co., Ansted, W. Va.; treasurer, William Buchanan; secretary, Major A. W. Fluegel; assistant treasurer, Roy S. Long, and assistant secretary, J. F. Steele. Directors are: D. Carl Anderson, W. J. Bottomlee, LeRoy Britt; George Buckley, F. E. Burger, F. M. Cassidy, A. L. Clark, E. H. Eckhart, A. V. Faull, W. T. Hawkes, C. V. Hunt, W. W. Hunter, Orval King, C. J. Kirby, Myron Kok, R. S. Long, L. K. Marmet, Alan McBane, H. C. Morton, Joe Mulligan, W. R. Perfater, Wayne Plymale Jr., W. D. Sharpenberg, Joshua Smith, C. R. Stahl, E. E. Stephens, O. G. Stewart, Scott R. Wolfe, R. R. Woodrum, G. M. Yaeger, R. F. Willis, Rush Meadows, P. O. Hamer, A. W. Fluegel and R. F. Overly.

New Mine Rescue Group Formed

The Mine Rescue Association, a new organization formed by mine-rescue groups in southern Illinois, held its first meeting Jan. 16 in Benton. The purposes

...with TYCOL lubricants on hand!

Take mining, for example. There's a Tycol lubricant for any application you can name: For instance, what about rock drills? . . . Tycol Amarex oils provide a strong lubricant film in drills and other percussion type tools. Wire ropes of mine hoists? . . . Use Tycol Amaclac lubricants if they are hand swabbed, Tycol Acadam oils if oil lubricated. Air compressors? . . . Tycol Avalon oils will keep them running smoothly. You always get top performance with Tycol lubricants. Why? . . . Because each Tycol grease and oil is manufactured from high quality base stocks and *tailored* for specific application. Get the full story of the entire Tycol line from your local Tide Water Associated office today!

Over 300 Tycol industrial lubricants are at your disposal . . . engineered to fit the job!

REFINERS AND MARKETERS OF VEEDOL . . . THE WORLD'S MOST FAMOUS MOTOR OIL

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INDUSTRIAL LUBRICANTS

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COMING MEETINGS

Eleventh Annual Anthracite Conference: May 7-8, Lehigh University, Bethlehem, Pa.

American Mining Congress: Coal Convention and Exposition, May 11-14, Cleveland, Ohio.

Rocky Mountain Coal Mining Institute: 49th meeting, June 28-July 1, Colorado Hotel, Glenwood Springs, Colo.

19th West Virginia Safety Conference: Meetings of Mines and Mining Section, 2:30 and 7.30 pm, April 22, Charleston, W. Va. Details from C. L. Wilson, New River & Pocahontas Consolidated Coal Co., Minden, W. Va.

set forth by the new association are the advancement of the sciences and engineering practices related to the prevention and control of mine fires and explosions; safe and effective methods of mine rescue and recovery operations following mine fires and explosions; professional improvement of its members; and encouragement of social relations among men who have engaged in mine rescue and recovery operations.

AIME Names Coal Div. Chairman

American Institute of Mining & Metallurgical Engineers has named Maurice D. Cooper coal division chairman. Mr. Cooper is director of mining engineering education for National Coal Association.

Somerset County Group Elects Officers

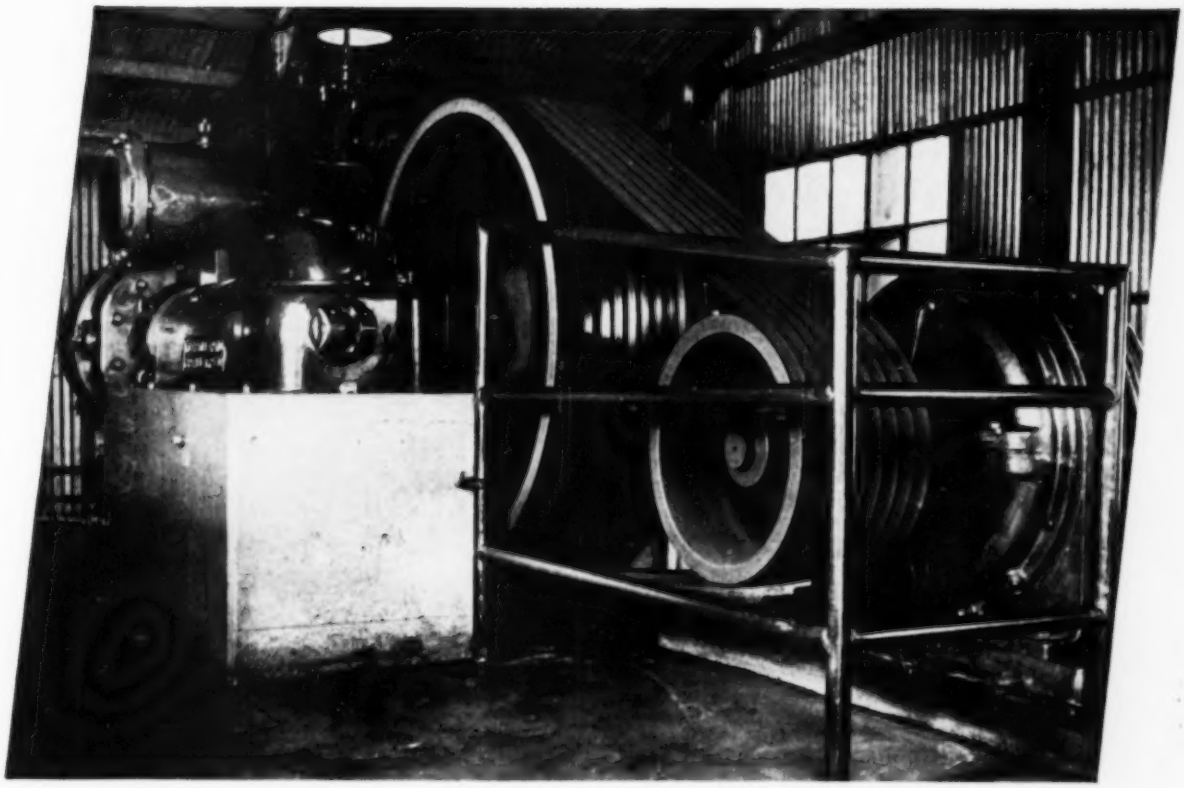
At the annual meeting, Marlin Weber, vice president, Bird Coal Co., Tire Hill, Pa., was elected president of the Somerset County Coal Operators' Association, succeeding Thomas Barnes 2nd, who is president of Bird Coal Co. E. A. Siemon, general superintendent, Hillman Coal & Coke Co., was named vice president; and C. B. Berkey, Jr., vice president, Wilbur Coal Mining Co., treasurer. Martin L. Markel was re-elected secretary and commissioner of the association. The following directors were named. Mr. Berkey, C. C. Dovey, Mr. Weber, E. J. Newbaker W. J. B. Mayo, Charles A. Merrill, E. F. Saxman, Mr. Siemon, and E. W. Custer.

Sam Bates Joins Mine Group

The Cumberland Valley Mining Institute, Middlesboro, Ky., has appointed Sam Bates secretary and safety director. For the past 5 yr he was an inspector for the Kentucky Department of Mines and Minerals.

Spearn Elected Chairman NEA Business-Industry Section

The Business-Industry Sec. of the National Education Association—a national education organization with 465,000 active and 850,000 affiliated teacher members—recently elected Dr. M. Edmund Speare, education director, Bitu-



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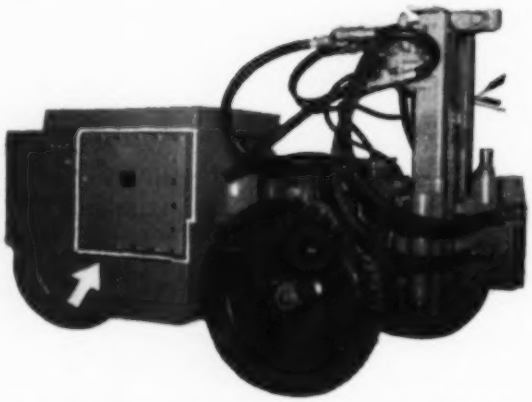

Photograph illustrates control used on Fletcher Roof Control Drill Model DAA, manufactured by J. H. Fletcher & Company, Huntington, West Virginia

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PLUNGER PUMP

Power end is made of hi-grade semi-steel with a large cover to facilitate inspection. All moving parts are completely self-lubricating. Intermediate shaft runs on adjustable roller bearings. Furnished V-Belt or Gear Drive. Size 5 x 5; Capacity, 50 gals. per minute, 2" suction and 1½" discharge.

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minous Coal Institute, executive chairman for the current year. The section embraces 78 of the major industries of the country, and was set up several years ago to promote cooperation between industry, which spends large sums yearly in supplying schools with educational material, and the teaching and administrative professions, as well as textbook publishers and encyclopedia editors.

Dr. Speare's executive committee comprises the educational heads of Westinghouse, General Motors, Standard Oil of N. J., Pittsburgh Plate Glass and the American Institute of Banking. Their winter meeting held in conjunction with the annual convention of the Nation's school superintendents in Atlantic City the week of Feb. 16, comprised a panel discussion dealing with the best instructional material provided to schools, a symposium by editors from publishing houses on how industry can help keep text books up to date, and an address by the executive secretary of the NEA National Council for Social Studies.

NEWS BRIEFS . . . from p. 136

of and in cooperation with the Signal Corps Engineering Laboratories, Fort Monmouth, N. J. Thus, Mr. Corey added, the bureau's quest is being concentrated on central-station power plants, which burn more than 100 million tons of coal yearly. Concurrently, however, as reported previously, the Pennsylvania Coal & Coke Co., 70 Pine St., New York, is carrying on a program of testing coal samples for recoverable germanium. Interested mine owners should contact PC&C for instructions before submitting samples.

New Mining Scholarship Established at Lehigh

Lehigh University trustees have received a new scholarship fund for students in mining engineering, established through a bequest of $30,168 by the late Mrs. Esther R. Fuller Warwick, Honesdale, Pa. Income from the fund, which will be known as the John T. Fuller endowment fund, in memory of her father, a Lehigh University alumnus, will be used "to grant a scholarship in the department of mining engineering to a deserving Pennsylvania boy working his way through Lehigh University."

Grants will be awarded on the basis of financial need, character and high scholastic achievement, and the number of awards each year will depend on the income available from the fund and the qualification of the candidates. The first award will be made this September and applications will be processed by the office of admissions. Mr. Fuller, who died May 18, 1939, went to the diamond mines of Kimberly, South Africa, immediately on graduating from Lehigh in 1903. There he managed the largest

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For immediate breathing protection in emergencies caused by fire or explosion, M.S.A. developed the Self-Rescuer. This approved safety item provides the precious minutes of emergency breathing protection so vital to the miner while traveling through carbon monoxide to fresh air.

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In toxic atmospheres where there is sufficient oxygen, this dependable mask provides complete breathing protection against smoke, poisonous gases and fumes (including carbon monoxide), singly or in combination. Bulletin No. EA-8.

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Inside emergency efforts play an important role in the success of the overall rescue operation. Miners equipped with the M.S.A. Chemox can safely travel through any area with the complete assurance that their breathing is safeguarded. All the wearer does is breathe—the Chemox generates its own oxygen supply from a replaceable canister and can be put into service in seconds. Weighing only 13½ lbs., it is designed for freedom of movement. U.S. Bureau of Mines Approved. Bulletin No. B-14.

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diamond mine in the world and later was with the Canadian Copper Co. and the Aluminum Co. of America.

Coal Company Earning Reports

Lehigh Coal & Navigation Co.—1952 net, $2,001,323, or $1.04 a share; compared with $1,646,820, for 1951, or 85c a share.

The Hudson Coal Co. and subsidiaries—1952, deficit of $745,855; 1951 net, $1,498,170.

Virginia Iron, Coal & Coke Co.—1952 net, $342,836; 1951, $414,305.

Ayrshire Collieries Corp.—6 mo to Dec. 31, 1952, net of $1,277,562 or $2.25 a share; same period of 1951, net of $1,416,685, or $2.49 a share.

Truax-Traer Coal Co.—9 mo to Jan. 31, 1953, net of $2,003,093, or $1.56 a share; 1952 period, net of $2,500,734, or $2.21 a share.

United Electric Coal Cos. and subsidiary—6 mo to Jan. 31, 1953, net of $824,785, or $1.22 a share; 1952 period, net of $931,914, or $1.37 a share.

West Virginia Coal & Coke Corp.—1952 net of $682,472, or $1.36 a share; 1951 net of $1,134,176, or $2.27 a share.

Violence Flares Anew In W. Va. and Kentucky

Shootings, explosions, beatings and ambushes in Clay and Leslie Counties, in eastern Kentucky, have provoked a call for a special federal grand jury to investigate violence in that area. The grand jury will be convened March 16 at Lexington. Meanwhile, a non-union coal

Safety Milestones

On Jan. 21 the Widen mine of the Elk River Coal & Lumber Co., Widen, W. Va., marked its sixth full year of operation without a fatality. During that period 4,864,347 tons was mined and the property increased its rate of output from 3,172 tpd in 1946 to 4,443 tpd in 1952. Reportedly, this fatality-free production has been exceeded by only two other mines in the state, both operations of the Island Creek Coal Co.

Reliance No. 7 mine of The Union Pacific Coal Co. at the end of 1952 completed its fifth consecutive year of operation without a lost-time injury. During the 5-yr period without an accident, Reliance No. 7 employees accumulated a total of 2,055,131 man-hours. Another UP mine, Stansbury No. 3, also chalked up a perfect record in 1952, working 442,860 man-hours without a lost-time injury. Company-wise all UP operations worked 3,719,243 man-hours in 1952, with a total of 19 lost-time injuries and one fatality.

Cleaning up with SECO

BRUNS COAL COMPANY
BEVERLY, OHIO

PROGRESSIVE OPERATOR GETS 225 T.P.H. OF COAL IN MARKETABLE SIZES

Here is just one of the dependable Seco vibrating screens on the job for Bruns Coal Company. This 5′ x 16′ double deck type H Seco is a real workhorse when it comes to cleaning and sizing coal.

Hour after hour, month after month, 225 tons of R.O.M. hit this smooth operating Seco, and it doesn't faze it a bit, thanks to Seco's fully controlled true circular action.

The big lumps averaging 50 tons per hour are discharged off the top deck with 4" opening, approximately 65 tons per hour of minus 4" plus 1½" are discharged off the bottom deck with 1½" opening and approximately 110 tons per hour of minus 1½" are delivered through the bottom deck.

Mr. Bruns is very well satisfied with the performance of his Seco vibrating screens.

How about your operation? Are you getting the better profits that clean, properly-sized coal can bring you? May we show you how a Seco can do this for you for pennies per ton? Write, wire or phone today!

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operator was arrested Feb. 6 on a charge of ambushing and wounding three union organizers and a union member Jan. 30. The wounded men were en route to Hazard from a union meeting at Manchester. The ambush was followed Feb. 2 by a blast from 20 sticks of dynamite that damaged a small union-owned grocery store near Manchester. The explosion capped an upsurge of violence that included blasting a coal truck Jan. 26, strewing nails on 6 mi of highway used by non-union trucks and a series of pot-shots that pierced the grocery store that was dynamited in February.

Near by, at Widen, 23 persons were indicted following a grand jury's investigation of a series of violent incidents growing out of the continuing strike of workers belonging to an independent union at operations of the Elk River Coal & Lumber Co. A portion of the independent union walked off the job several months ago and violence broke out in December with the blasting of two railroad bridges and frequent exchanges of gunfire between pickets and miners who continued at work.

Meanwhile, at Wise, Va., seven persons, including a union district official and two former union employees, were indicted Jan. 31 on charges of dynamiting and destroying mine property in a series of incidents dating as far back as September, 1951, and continuing through November, 1952. Five days earlier, at Grundy, Va., five union members, two of them officials, were fined $500 each and given 6 mo in jail for violating an injunction forbidding unlawful picketing at properties of the non-union Oakwood-Redash Coal Co.

Seaway Power Ruling Due Soon

The Federal Power Commission is expected in March to issue its opinion and order on two proposals for hydroelectric installations in the International Rapids section of the St. Lawrence River. Open hearings were concluded Feb. 2 with testimony from R. T. Laing, secretary, Central Pennsylvania Coal Producers' Association, and Norman F. Patton, The Anthracite Institute, both of whom warned of injury to the railroad and coal industries if the project is approved.

Deny Efforts to Wipe Out Pennsylvania Mines Office

A task-force committee of bituminous and anthracite producers has denied that it recommended abolishing the Pennsylvania Department of Mines and merging it with the State Department of Labor. The allegation had been made by the Chesterman Committee, which is studying various state departments with a view to greater economy. The task-force committee did make the following recommendations: (1) change the name of the Department of Mines to the Department of Mineral Industries; (2) bring all extractive industries under the new department; (3) re-study the mine-sealing program to determine what mines should be sealed and whether the program really is effective; and (4) transfer supervision of stripland reclamation from the Department of

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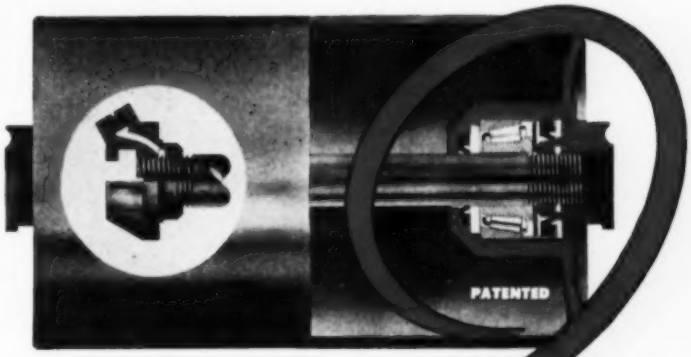

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Continental's Unit-Sealed "UST" Conveyor Idlers, incorporating Timken Bearings, Garlock Klozures, are the answer to the operator's prayer.

The Unit Bearing Assemblies—"sealed unto themselves" provide an ample but not excessive grease reservoir. This represents a saving of grease and further eliminates any possible migration of the grease from upper to lower bearings on inclined rolls. The lubricant is a top quality water repellent grease of a stable consistency with a wide temperature range for long life.

Most important—this construction permits operating the Continental "UST" Idler without relubrication for 1-2-3 years depending upon the severity or character of conditions.

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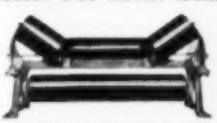

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Forests & Waters to the Department of Mines.

Cops Honors in Illinois As First 100% Safety-Trained Mine

Miners and officials of the Green Diamond mine, Mid-Continent Coal Corp., Marissa, Ill., have completed the 20-hr Accident-Prevention course of the USBM and thus have made their mine the first in Illinois to be trained 100% in safety. In recognition of their achievement, miners, officials, the company and the UMWA local have received certificates from state, federal and UMWA international offices. Company officials attribute success of the program to joint efforts of the Illinois Department of Mines & Minerals, the USBM, local and district union officers and mine supervisors.

Bill Asks RFC Help For Private Coal-to-Oil Plants

Senator Pat McCarran (Dem., Nev.) has put into the legislative hopper a bill authorizing the Reconstruction Finance Corp. to make grants to qualified persons for construction of commercial-size synthetic liquid fuel plants, under approval of the Secretary of the Interior. The bill also would authorize the RFC to finance the government's participation in government-private industry agreements covering research and development of methods and processes. This is the same bill that died in committee in the 82nd Congress.

And For Your Information . . .

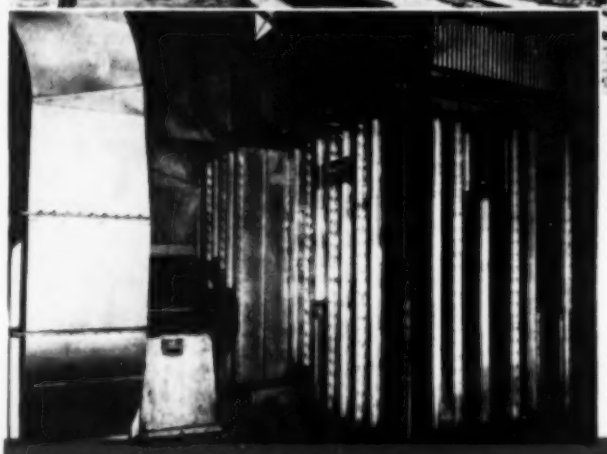
Both John L. Lewis and Harry M. Moses, president of the BCOA, were named Feb. 18 by Secretary of Labor Marton P. Durkin as members of a 15-man advisory committee composed of representatives of the public, labor and industry. First job of the committee will be to study the Taft-Hartley law and recommend possible changes.

The Bear Canyon Coal Co., Trinidad, Colo, is suing the UMWA for $30,000 in damages as a result of stoppage reportedly called in a dispute over hiring of a former employee. The suit charges union officials "unlawfully, wrongfully and maliciously and in violation of the terms of a contract" called workers off.

In The Galesburg, Ill., area, a man has confessed setting fire to a house in the mistaken belief that he was protesting strip mining, according to state officials. He thought the house was owned by the Midland Electric Coal Co. and sought to demonstrate against the company's stripping operations in the region.

The UMWA announced Jan. 30 that John L. Lewis had been re-elected president of the union for another 4-yr term and that he had been unopposed for the office. Also re-elected were Thomas Kennedy, vice president, and John Owens, secretary-treasurer.

The supply house of the Keen Mountain mine of the Red Jacket Coal Corp. was destroyed by fire Feb. 2, with the damage estimated at well over $100,000. Probable cause of the fire was given as defective wiring.



At the Ilmann Plant of Pocahontas Fuel Co., Pocahontas, Va., dust is captured at the air plant (left) in Pangborn Dust Collectors.

Close-up of Pangborn Dust Collector operating within plant.

For more profitable coal preparation

Look to

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More mechanization and more production have helped the coal industry meet industry's vastly increased demands over the past decade. But they have created a serious problem for coal processing plants. If *you* face this problem—it will pay you to look to Pangborn Dust Control for the answer!

Pangborn Dust Control traps dust at the source—at tipples, dry cleaning, de-dusting and other operations. And Pangborn Dust Control saves you money, pays for itself by . . . (1) improving the reclamation of valuable dust . . . (2) lowering plant maintenance costs . . . (3) increasing the life of your machines because they operate in a cleaner atmosphere. What's more, higher morale and better health of employees mean increased production.

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Practical Answer to Your Rust-Producing Conditions

Rust-Oleum resists rain, snow, heat, fumes, sun, salt water, and chemicals. So easy to use by brush, dip, or spray that one man often does the work of two.

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Indoors and out, Rust-Oleum has proved its capacity to stop rust! Rust-Oleum can do the same for your tanks, metal sash, stacks, girders, roofs, buildings, machinery, pipes, etc.

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Rust-Oleum is *distinctive* as your fingerprint. It incorporates a specially-processed fish oil vehicle that *dries,* is *odor-free,* and is formulated in *many colors.* Specify Rust-Oleum — accept no substitutes.

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Among the Manufacturers

Nelson L. Davis Co., Chicago, has appointed Nicholas J. Ali chief engineer, succeeding the late G. H. Bergstrom. Mr. Ali, formerly chief electrical engineer, joined the company in 1947 at the time of its organization.

Rockbestos Products Corp., New Haven, Conn., has promoted Richard H. Bamford, district sales manager in St. Louis since 1949, to assistant sales manager at the home office. Mr. Bamford, who joined the company's sales department in 1939, will be succeeded in the St. Louis office by Edward J. Parker, who came to Rockbestos from Peter Kiewit Sons Co.

Thew Shovel Co., Lorain, Ohio, has promoted three engineers to newly created posts in the organization. R. H. Zeilman, associated with the company for 29 yr, and chief engineer since 1938, has been appointed director of engineering. M. L. Sheetz, automotive consultant and assistant chief engineer, Moto-Crane Dept., has been named chief executive engineer, and O. Von Mehren, assistant chief engineer since 1947, has been promoted to chief design engineer.

P. C. Smith has been appointed manager of the Westinghouse Electric Corp., Transportation and Generator Div., E. Pittsburgh, Pa. Mr. Smith, who joined the Westinghouse graduate student training course on graduation from the University of North Carolina, became design engineer of induction motors in 1929 and in 1944 was named assistant to the manager of the Transportation and Generator Div.

Fairmont Machinery Co., Fairmont, W. Va., has elected Adrian W. Rich, president of the company. Mr. Rich, who was formerly vice president, is a graduate of the U. S. Naval Academy at Annapolis and served with the Navy in World War II in the Pacific, Mediterranean and North Atlantic areas. He is presently commanding officer of the local Naval Reserve unit. Formerly with Westinghouse Electric Corp., Mr. Rich has served successively as assistant to the vice president, assistant to the president, general manager of operations and vice president of Fairmont Machinery since joining the company in 1947.

Edgar R. Phillips has joined the Lee-Norse Co., Charleroi, Pa., as sales manager. Mr. Phillips, who has been active in coal mining sales work for many years, will devote his time particularly to the present new development of the Lee-Norse Miner. In his work in the industry

At the Trail, British Columbia, Lead and Zinc Mine, owned and operated by The Consolidated Mining and Smelting Co. of Canada, Ltd.

WITH THE **DIFFERENTIAL ROTARY DUMPER**

It's everyday procedure at this Canadian lead and zinc mine. A touch of the air control starts the dumping action and the law of gravity takes over. It's as simple as that!

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BUY'EM FROM GUYAN

An improved accessory for pumping equipment—provides straining surface approximately double the area of pipe for which the unit is tapped. Has built-in check valve.

GUYAN MACHINERY CO.
LOGAN W. VA.

tipple tender

HUGE tonnages of ore are loaded into cars at this tipple. Cleaning up spillage was a problem before the "PAYLOADER" arrived. Now, equipped with a special tunnelled bucket this agile tractor-shovel straddles each rail and cleans up neatly between and outside of the tracks, piles the ore to one side and then loads it into the cars as they approach the tipple.

This is one of many ways "PAYLOADER" versatility and flexibility is being utilized by the mining industry to lower the cost of production. These unique Hough-built machines are complete integrated tractors-with-shovels, having proper built-in balance and weight distribution, multiple speeds in reverse as well as forward and other outstanding advantages for faster, better, digging, stripping, loading, carrying and dumping. "PAYLOADERS" are available in a wide range of sizes and models up to 1½ cu. yd. bucket capacity — are sold and serviced by a nationwide group or responsible, experienced Distributors. The Frank G. Hough Co., 735 Sunnyside Ave., Libertyville, Illinois.

WRITE for literature on any **PAYLOADER®** tractor-shovel: Model HA — 12 cu. ft.; Model HAH — 15 cu. ft.; Model HE — ⅓ cu. yd.; Model HF — ¾ cu. yd.; Model HY — 1¼ cu. yd.; 4 wheel drive Model HR — 1 cu. yd. and HM— 1½ cu. yd. There is no obligation.

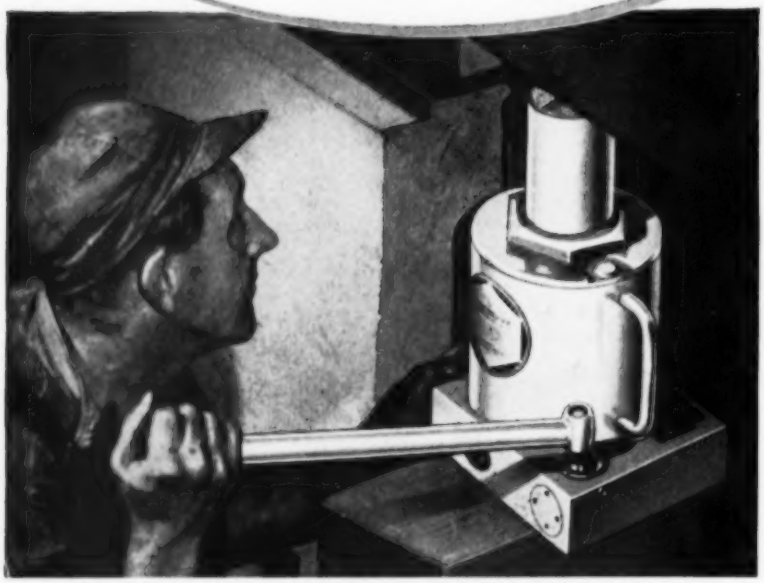
SAY "HUFF"

PAYLOADER®

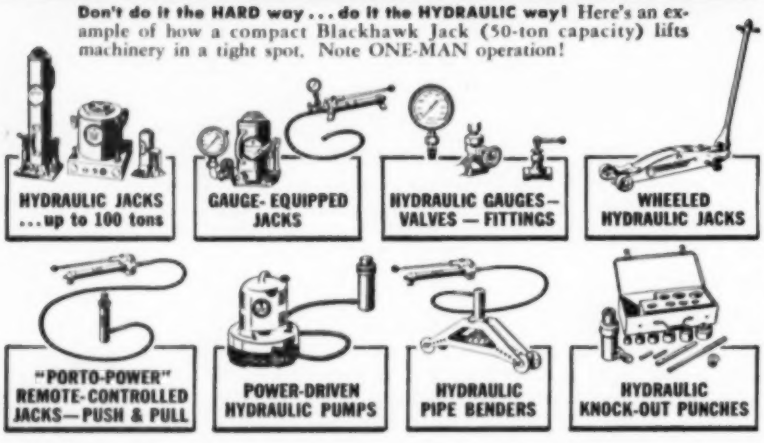
THE FRANK G. HOUGH CO. • Since 1920

Pick the right jack for the job

...from the world's most complete line of hydraulic equipment



Don't do it the HARD way... do it the HYDRAULIC way! Here's an example of how a compact Blackhawk Jack (50-ton capacity) lifts machinery in a tight spot. Note ONE-MAN operation!



YOU GET ALL THESE HYDRAULIC TOOLS ONLY FROM BLACKHAWK

BLACKHAWK

Save buying time when you need hydraulic equipment. Specify Blackhawk—and be sure you'll get the hydraulic tool that will match your requirements exactly. Order from leading supply houses. Write for free catalogs. Products of

Blackhawk Mfg. Co., Dept. J-4533, Milwaukee 1, Wisconsin.

Mr. Phillips previously was associated with the Timken Roller Bearing Co., Joy Mfg. Co. and Pittsburgh Gear & Machine Co.

H. C. Allington has been elected vice president in charge of sales of the Eastern Div., Colorado Fuel & Iron Corp., with headquarters in New York City. Serving as general manager of sales, Wickwire Spencer Steel Div., of the company since October 1947, Mr. Allington will supervise sales in the Eastern Div. of all products manufactured by Colorado Fuel & Iron and its subsidiaries, including the recently acquired John A. Roebling's Sons Corp.

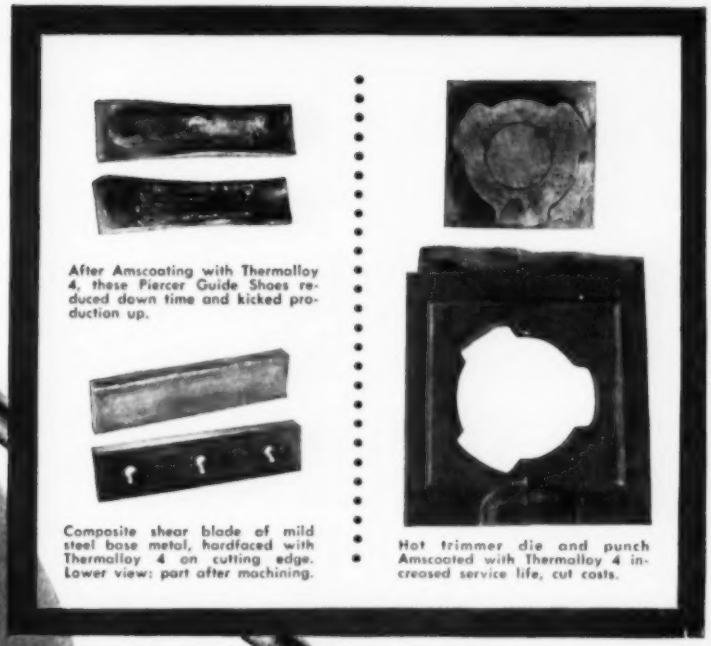
Herbert E. Fenton, formerly a mine foreman with Pittsburgh Coal Co., has been named Pittsburgh area mining sales and service engineer for the Carboloy Dept., General Electric Co., Detroit, Mich. Mr. Fenton, who will work in the southwestern section of Pennsylvania, at one time was associated with the Cardox Corp. Carboloy also has advanced William A. Reich to manager of advance development engineering. A graduate of Carnegie Institute of Technology, Mr. Reich joined GE in 1937 and for the past 7 yr he has been engineer in charge of the metallurgy section of the Turbine Div. laboratory in Schenectady.

Reliance Electric & Engineering Co., Cleveland, has named Dr. Cyril G. Veinott consulting engineer for the development and improvement of design methods covering both standard model and special-purpose AC machinery. Dr. Veinott, for the past 25 yr, was associated with the Westinghouse Electric Corp. at the company's plants in Springfield, Mass., and Lima, Ohio.

Marion Power Shovel Co., Marion, Ohio, has appointed E. Edward Staker sales representative in the Northwestern Ohio territory, with offices in Marion. Mr. Staker has served as a service and erection engineer with Marion since July, 1951.

Chain Belt Co., Milwaukee, Wis., has appointed Bernhard G. Schneider, formerly manager of engineering services, to the newly created post of assistant chief engineer, conveyor equipment section of the company's Conveyor and Process Equipment Div. Joining Chain Belt in 1926 as an engineering apprentice, Mr. Schneider has since served in various technical and supervisory capacities in the conveyor equipment section. The company also has named Edward M. Rhodes assistant to the general manager, and Roland V. Poisson assistant sales manager of its Baldwin-Duckworth Div., Springfield, Mass. Mr. Rhodes joined Chain Belt as a sales trainee in 1941 and was made sales manager of the division in 1945. Mr. Poisson, with the company since 1944, formerly was in charge of sales for Duckworth automotive timing chains.

United States Rubber Co., New York, has appointed J. W. Loveland eastern division sales manager for the electrical wire and cable department, succeeding E. T. Corbus, named manager of electri-



After Amscoating with Thermalloy 4, these Piercer Guide Shoes reduced down time and kicked production up.

Composite shear blade of mild steel base metal, hardfaced with Thermalloy 4 on cutting edge. Lower view: part after machining.

Hot trimmer die and punch Amscoated with Thermalloy 4 increased service life, cut costs.

BEAT HEAT WEAR and IMPACT with AMSCO THERMALLOY 4

If you have a wear problem involving high temperatures and requiring resistance to impact, this new Amsco hardfacing electrode can save you time and money

Elevated temperatures are tough to cope with in situations involving thermal shock, metal-to-metal wear, hot gas corrosion, high temperature oxidation—especially when you need great impact resistance. Here's where Amsco Thermalloy 4 can step in and give you longer service life, and big savings in time and money.

Supplied as both a composite coated electrode for electric welding or as a bare cast rod for gas welding, both types deposit a high-carbon stainless alloy containing chromium and nickel as the principle alloying elements. In many applications, it can replace expensive nickel base alloy materials. Thermalloy 4 is packaged in 50-lb. boxes or in 10-lb. packages in 50-lb. boxes. For detailed analyses and other pertinent information, write for catalog sheet on Thermalloy 4 or contact your nearest Amsco distributor.

AMSCOATING

THE RIGHT WAY TO SAY HARDFACING

AMERICAN Brake Shoe COMPANY

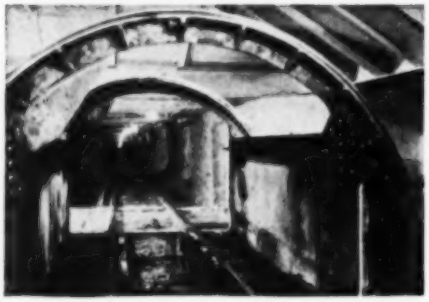
AMERICAN MANGANESE STEEL DIVISION

409 EAST 14th STREET • CHICAGO HEIGHTS, ILL.

Other Plants: New Castle, Del., Denver, Oakland, Cal., Los Angeles, St. Louis. In Canada: Joliette Steel Division, Joliette, Que. Amsco Welding Products distributed in Canada by Canadian Liquid Air Co., Ltd.

NOLAN

ROTARY CAR DUMPS keep coal coming faster



Heavy Cage Assembly with machined cast steel rings. Rails positively aligned by "Patented" Rail Aligning Stop.

More and more, the quick, safe handling of coal is imperative for profitable operation.

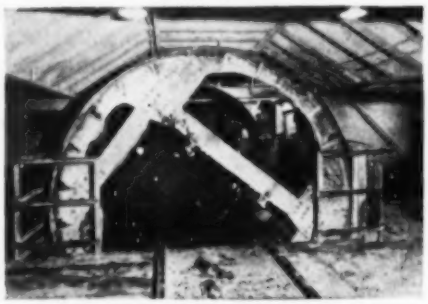
Many mines throughout the country are attaining new high efficiency in coal production with the Nolan Rotary Car Dump. Distinctive features include:

1. Gear Drive or Direct Traction Drive with Patented Positive Starting Lug
2. Patented Positive Rail Aligning Stop
3. Heavy Machined Steel Rings

There are many other quality engineering advantages built into the Nolan Rotary Car Dump—features that encourage better, safer, speedier coal delivery, at lower costs.

Write for illustrated catalog giving complete details, and ask us to help solve your problems through our long experience in car control and dumping operations.

Push Button Starting. Dump starts slowly—no slipping—then rotates at higher speed for quick cycle.



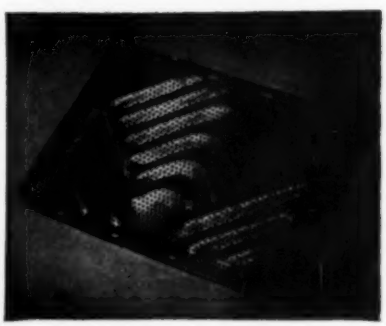
Dump slows down for stopping—no jar—rail aligning stop is automatic.

THE NOLAN COMPANY 106 PENNSYLVANIA ST. BOWERSTON, OHIO

COAL MEN ON THE JOB . . .

AT 1952 NCA CONVENTION (left photo)—Raymond Salvati (left), president, Island Creek Coal Co.; R. L. Ireland, chairman, executive committee, Pittsburgh Consolidation Coal Co.; R. E. Snoberger, president, and M. L. Patton, vice president, Truax-Traer Coal Co.

TENNESSEE COAL CO. (right photo)—S. M. Snyder (left), Joy Mfg. Co., Middlesboro, Ky.; W. T. Ray, secretary-treasurer, and H. W. Randolph, foreman, Tennessee Coal Co., Monterey, Tenn.



"W" DENTED SHAKER SCREENS

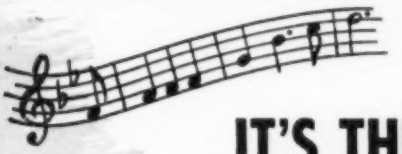
A "must" when it comes to obtaining an efficient job! *Good* because the spreading and collecting riffles give uniform spread of material over the entire screen surface . . turns the top and middle flow of material down in direct contact with the screen . . . gives an increased screening efficiency up to 33% on fine sizes over an undented flat screen.

Comes in Carbon and Stainless Steels and Manganese Bronze. No sag.

Write us today. We shall reply promptly.

REMALY MANUFACTURING CO., INC.
TAMAQUA, PA.

My Sweetheart's No Longer "A *Mule in The Mine*"...



IT'S THE RELIANCE TYPE 'T' HEAVY DUTY

"The Toughest Motor Ever Built!"

Reliance Totally-enclosed, Non-ventilated, Explosion-proof Motor; one of several Reliance motor types especially developed for the mining industry.

Wise operators nowadays provide their miners with dependable, economical Reliance Type 'T' Heavy Duty Motors. These rugged motors power 95% of all rubber-tired underground haulage... 70% of all coal loaders... and increasing numbers of other underground machines performing the toughest jobs in mining.

Type 'T' motors embody refinements developed by Reliance engineers working closely with users in the application of thousands of motors to the coal-mining industry. Especially designed, electrically and mechanically, for difficult underground jobs, Reliance motors have vital parts thoroughly protected against coal dust, moisture and other hazards encountered in the toughest mining jobs. They *stay* clean and dry... last longer with less maintenance.

The result... you enjoy exceptional freedom from tonnage losses due to motor failures.

Reliance Type 'T' Motors are available in ratings from ¼ to 100 hp. to meet standards of the Bureau of Mines for use on "permissible" equipment. Low height and compact design satisfy space limitations of underground applications.

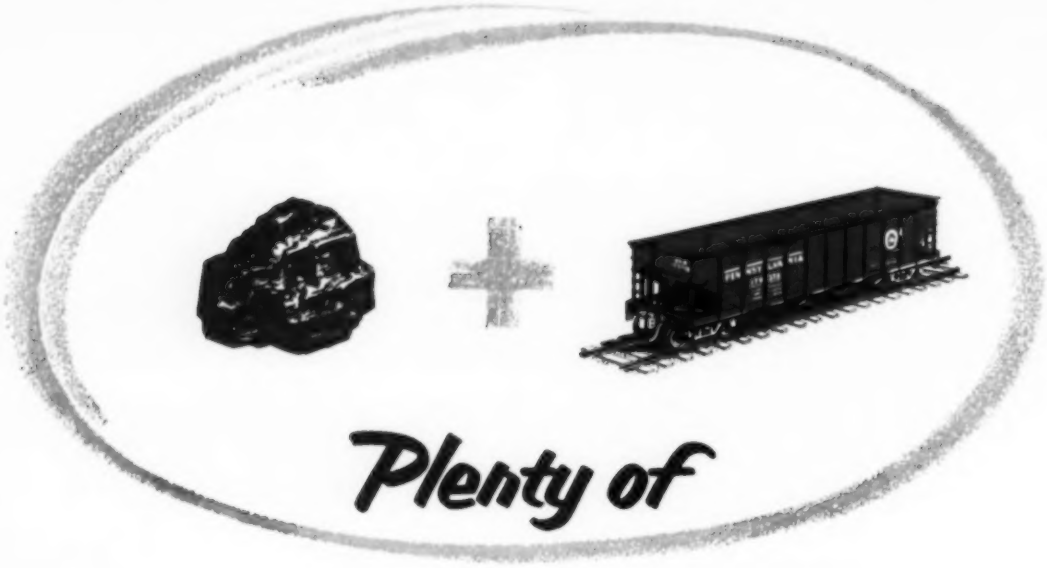
Next time you order new equipment, specify Reliance. See for yourself how these *tough* motors keep production up... and costs down.

C-1446

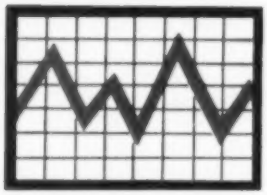
Write for Bulletin C-2001 describing the complete line of Reliance Type 'T' Motors through 1000 hp.

RELIANCE ELECTRIC AND ENGINEERING CO.

1055 Ivanhoe Road, Cleveland 10, Ohio • *Sales Representatives in Principal Cities*



Plenty of Fuel for Thought



In 1951—11,343,997 cars of coal, coke and ore loaded on the rails! In 1947—12,471,285 cars! But in 1949—only 9,016,311! And here's a comparison by the month . . . February, 1950, only 323,373 cars loaded. But in August, 1951—1,125,006! What a contrast!

Peaks and valleys over the years—and month by month—but the railroads have *never failed* to keep industry's wheels turning and American hearths warm.

There have been car shortages, as there have been meat shortages, metal shortages, labor shortages. It would be wasteful to build cars just for the occasional peak. But every year, more than 80% of the Nation's coal requirement moves by rail to the consumer . . . and the job gets done no matter what the demand.

The Pennsylvania Railroad owns the world's greatest fleet of hopper cars—is always ready to do more than its share in moving America's coal and coke.

COAL HEAT IS BEST

because

Coal Heat is HEALTHFUL HEAT

Coal Heat is SAFE HEAT

Coal Heat is STEADY HEAT

Coal Heat is CLEAN HEAT

Pennsylvania Railroad

cal utility sales. C. R. Pickens has been made the southeastern division sales manager, located at Atlanta, and H. J. Cluver middle-Atlantic division sales manager, with headquarters at Philadelphia.

Fairfield Engineering Co., Marion, Ohio, has appointed J. J. Bray, assistant sales manager since 1939, sales manager of its Standard Products Div., formerly known as the portable conveyor and feed machinery divisions. Other appointments announced by the company in connection with its expansion program include Wayne H. Kuhn as general sales manager; W. R. Reichenstein as sales manager, Contract Div.; and Bruno Rybicki as chief engineer.

William Beaser, president of the Whitmore Mfg. Co., Cleveland, died Feb. 2. Mr. Beaser, whose experience dated back to the early days of the electric railway, would have celebrated his 60th yr of continuous service to the lubrication industry this month. He and Samuel W. Whitemore founded the Whitemore Mfg. Co. in 1893.

General Electric Co., Chemical Div., Pittsfield, Mass., has put into operation a new silicone chemical plant located in Waterford, N. Y., expanding facilities for the manufacture of silicone materials to meet increasing industrial demands. The expansion, costing in excess of $5 million, will help relieve current shortages of many silicone materials for defense and consumer industries, the company reports. Plans for even larger facilities will ready General Electric for an expected tenfold increase in total industry demand for all silicone products by 1960, it says. G. E.'s Construction Materials Div. has named T. J. Marshall and K. W. Macdonald General Electric construction materials district representatives. Mr. Marshall, with the company since 1935, has been assigned to handle accessory equipment products in the north central district, with offices in Chicago. Mr. Macdonald, will handle the full line of construction materials in the Columbus trading area of the division's Great Lakes district, with temporary offices in Cleveland.

The Pennsylvania Crusher Co., Philadelphia, has appointed the Mine & Smelter Supply Co., 1422 17th St., Denver 17, Colo., and 1515 11th St., El Paso, Texas, as representatives in New Mexico, Arizona, western Texas, Colorado, western Kansas, Nebraska, and South Dakota, and eastern Wyoming and Montana. The Alliger & Sears Co., 2203 Fannin St., Houston, Texas, will represent Pennsylvania Crusher in central and eastern Texas and southern Louisiana.

Watt Car & Wheel Co., Barnesville, Ohio, has appointed the C. B. Morris Co., Glenshaw, Pa., as sales representatives in the territories of northern West Virginia, western Pennsylvania and Ohio.

CELAB RECTIFIERS

FOR D-C POWER UNDERGROUND

Portable, Drip-Proof, and Dependable Units are the result of many years experience in the manufacture of metallic rectifiers for mining. New Rugged units built to drag around in low head mines, to withstand roof-cave-ins, moisture accumulations; drip-proof meters, newest circuit breakers, thermal shunt trips, PROVEN IN THE WORLD'S LARGEST MINES. Use our 40 years experience free in solving your D-C problems.

25, 30, 40, 50, 62½, 75 K.W. SIZES
SHIPPED FROM STOCK.
100, 150, 200, 250, 300 & 500 K.W.
DELIVERY IN 30 TO 60 DAYS.
TRANSFORMERS—30 DAYS.

CLARK ELECTRONIC CORP.
PALM SPRINGS, CALIF. — PHONE 8-3011

you play it **SAFE** with Safety-Pulls

Just as important as the time and labor-saving advantages of Coffing Safety-Pull Ratchet Lever Hoists, is the way each one protects your men from injury, your equipment from damage.

Here's why:

Only the finest steel is selected for each part.
Hooks will not break or straighten out.
Dual ratchet and pawl will not slip — even if handle is accidently released.
Handle will bend before any other part is overloaded beyond safe limits.
Every Safety-Pull is tested at 100 percent overload.

Coffing Safety Pull Ratchet Lever Hoists. 10 roller chain models, ¾ to 15 tons. 2 coil chain models, ¾ and 1½ tons

Write for Bulletin G 3SP — and the name of your nearest distributor. Make use of his broad experience and complete service facilities.

Quik-Lift Electric Hoists • Hoist-Alls • Mighty-Midget Pullers • Spur-Geared Hoists • Differential Chain Hoists • Load Binders • I-Beam Trolleys

COFFING HOIST COMPANY
Danville, Illinois

Your equipment gets

TOUGH

when you install

J&L JALLOY HEAT-TREATED PLATE

for impact and abrasion resistance on equipment like this

J&L Jalloy Heat-Treated Plate—the mining and quarrying steel—can help you cut maintenance costs, increase the service life of equipment that takes a real beating from severe impact and abrasion.

Here's why—heat-treated Jalloy was developed by J&L specifically for heavy duty applications such as those encountered in the mining and quarrying field. It's a heat-treated, fine-grain, manganese molybdenum steel with both yield strength and Brinell hardness *4 times* as great as mild steel. The result—J&L heat-treated Jalloy *lasts 4 times as long as mild steel* yet costs only twice as much.

It's easy to see why more and more progressive equipment owners have turned to J&L heat-treated Jalloy to do a dollar-saving job for them. If you're responsible for the economical operation of earth moving or handling equipment you'll want complete information on this modern mining and quarrying steel. Just fill in the coupon for a free copy of our Jalloy Booklet—"For Longer Wear . . . Less Repair."

W-3059

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PITTSBURGH

Jones & Laughlin Steel Corporation
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☐ Please send me a free copy of your booklet—"For Longer Wear . . . Less Repair."
☐ Please have your representative call.

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Company _____

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when COAL is treated with

Ashland PERMATREAT COAL SPRAY

You have all these advantages when stoker and industrial grades of coal are treated with PERMATREAT COAL SPRAY. Handlers approve its cleanliness, whether firing, conveying to and from stockpiles, or transferring from loaded cars to lake boats for re-shipment. Fines do not settle in the car or stockpile; degradation is minimized; water runs off faster. This oil-treated coal does not lose its dust-proof and freeze-proof characteristics even under extreme weather conditions.

Ashland PERMATREAT COAL SPRAY

ASHLAND OIL & REFINING COMPANY

Ashland, Kentucky

It's Easy to See
PLASTEX
Yellow PIPE
is safer
There's no mistaking PLASTEX Yellow pipe—it's easy to distinguish, easy to trace . . . provides maximum protection against accidental damage or becoming fouled with other equipment.
always visible
PLASTEX Yellow pipe fairly glows in dark mine passages—never loses its striking identity. Color goes all the way through, won't fade or stain and resists dirt accumulations.
longer lasting
In addition to the proven advantages of lightweight, flexibility and guaranteed service against rust, rot and corrosion, PLASTEX Yellow pipe lasts even longer with less maintenance because it practically eliminates the risk of damage caused by poor visibility.
Available NOW
from your supplier. Write for sample and complete specifications.
The PLASTEX Pipe & Extrusion Co.
Columbus 3, Ohio
PLASTEX PIPE
CORROSION PROOF
Specify PLASTEX Yellow for better, safer mine piping.

Roots-Connersville Blower Div., Dresser Industries, Inc., Connersville, Ind., has promoted D. A. Johann to vice president in charge of sales. Mr. Johann joined the company in 1946 as manager of the Chicago district office and had served as general sales manager since January, 1951. E. P. Roudebush, works manager for the past 2 yr, has been advanced to vice president and works manager, in charge of all manufacturing at the company's plants.

West Virginia Steel & Mfg. Co., Huntington, W. Va., held open house Jan. 15 to show some 160 representatives of suppliers and customers and other guests the operation of its new electromelt furnace, blooming mill and other facilities recently completed under a $2,750,000 plant-expansion program. A major factor in the company's decision to build a steel-making plant of its own was the difficulty of obtaining sufficient special-analysis steel to meet customer requirements for its expanded line of products. With the new equipment, the company will produce about 6,000 billets a month. Of particular interest to the company in establishing the plant was capacity to produce specification steel suitable for making roof bolts for mine use in sufficient quantity to meet the increasing demand.

An educational comic book showing that productivity is the key to America's prosperity has been released as the fifth in a series booklets sponsored by Bemis Bro. Bag Co., St. Louis 2, Mo., in the interests of better economic education in America. Entitled "A Better Life for You," the standard-sized color comic tells how machines put more men to work and how more production per man per hour means a better living for everyone. Further information about the program, sample booklets, etc., may be secured by interested firms from either Bemis Bro. Bag or Harvey Publications, Inc., New York 23, publishers of the series.

Aeroquip Corp., Jackson, Mich., has elected George J. Fischer vice president, sales, and Matthew J. Betley vice president, manufacturing. Mr. Fischer, general sales manager since September, 1952, was associated with the B. F. Goodrich Co. for 18 yr prior to joining Aeroquip. Mr. Betley was with Electric Sprayit Corp., Sheboygan, Wis., before joining Aeroquip in September, 1952.

W. O. & M. W. Talcott, Inc., Providence, R. I., has promoted John W. Chase, sales manager since 1952, to vice president and secretary, with complete charge of operations. The promotion of Mr. Chase, according to the company, is timed to coincide with the opening of a new stage in the company's growth; a part of which includes the expansion of Talcott services to the mining industry.

Reo Motors, Inc., Lansing, Mich., has formed a new Industrial and Marine Engine Div. Sales activities and engineering developments of the new divi-

sion will be headed by R. D. Jacobs, II, who joined Reo in 1951 to assist in the preliminary groundwork. Before joining the company, Mr. Jacobs was a marine installation engineering advisor for the sales department of General Motors Detroit Diesel Engine Div.

Bucyrus-Erie Co., S. Milwaukee, Wis., has named Cleveland Brothers Equipment Co., Route 322, Harrisburg, Pa., with branches in Wilkes-Barre and Frackville, Pa., distributor of Bucyrus-Erie ⅜ to 4-yd gasoline, diesel and single-motor electric general purpose convertible excavators, truck-mounted Hydrocrane and Hydrohoe as well as Red Arch dragline buckets, in east central Pennsylvania.

The Pittsburgh Screw & Bolt Corp., Pittsburgh, has appointed Robert B. Algie assistant vice president—sales. Mr. Algie formerly was assistant manager of sales for Jones & Laughlin Steel Corp. and was associated with Forbes Steel Corp.

The Baker-Lull Co., formerly the Lull Mfg. Corp., Minneapolis, Minn., a new subsidiary of the Baker-Raulang Co., has named Gilbert C. Strege president of the company. Mr. Strege recently resigned as manager of the McBee Co.'s Technical Div. in Milwaukee, to join Baker-Lull. Other newly-elected officers are: LeGrand H. Lull, G. B. Davis, John A. Matousek, C. N. Sumwalt, A. C. Smith, directors; Patrick Lamb and Harry Conklin, vice presidents.

United States Steel Corp., Pittsburgh, has named Milton Male manager of the building and construction industries section of its commercial department. Mr. Male, a director of housing research in the research and technology division since 1946, will have responsibility for co-ordinating and assisting the technical activities of U. S. Steel's housing subsidiary, Gunnison Homes, Inc.

New Books for Coal Men

Paying Company Executives

Executive Pay Plans, 1952-53, by W. J. Casey and J. K. Lasser. Many companies are puzzled about how to keep the compensation of their executives in the running with mounting taxes and inflation. This book explores the various plans that now are finding wider use, benefiting top officers as well as the company itself. *160 pp. 8½ x 11-in; imitation leather. $12.50. Business Reports, Inc., 225 West 34th St., New York 1, N. Y.*

Safe Truck Operation

Operating Heavy-Duty Trucks Safely. This is a sound slidefilm made especially for men engaged in hauling at surface mines. Topics covered are safe methods of driving, towing, dumping, riding, and mounting and dismounting. 35-mm. *No price quoted. National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.*

Eliminate 70% to 90% of Conveyor Downtime

Cedarapids Schrock Built by IOWA

MOTORIZED HEAD PULLEYS

eliminate maintenance on chains, belts, sprockets, Universal drives, countershafts, etc.

EVERYTHING is contained INSIDE the pulley shell!

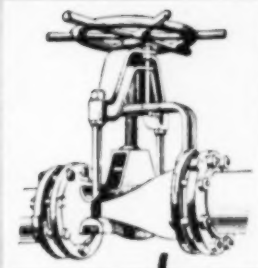
HERE'S a money-saving departure from conventional conveyor drives. A Cedarapids-Schrock *Motorized* Head Pulley is simply a new application of the long-proven gear reduction drive, with everything . . . electric motor, reduction gears and all moving parts . . . contained inside the drum, completely protected from grit, dirt and weather and with no outside parts or motors to service. 70% to 90% of conveyor trouble and downtime is saved by eliminating the exposed parts necessary with conventional pulley drives. In operation, the pulley shell rotates about the electric motor which is held stationary by a torque arm attached to the conveyor frame. The speed of the shell depends on the combined reduction ratio of the pinions and gears inside the shell. Compact, easy-to-install, job-proved Motorized Head Pulleys are available in sizes from 5 to 30 HP and in various widths.

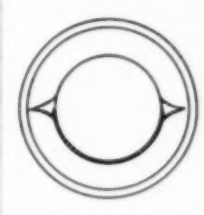
Find out all the advantages of converting your belt conveyor or belt-bucket elevator installations to *motorized* efficiency before you need head pulley replacements. See your distributor today, or write for Bulletin MP-1.

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa, U. S. A.

Built for sale in Arizona, California, Nevada, New Mexico, Southern Oregon, Southwestern Utah and Texas by
YUBA MANUFACTURING CO.
(Pulley and Sprocket Department)
Benicia, Calif.

it's
***HINGED**
for longer wear





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RUBBER PINCH VALVES
FOR ABRASIVE PULPS AND CORROSIVE LIQUIDS
*PATENTED

SIZES 1" to 12" DIA.

WRITE FOR FREE BULLETIN . . . . .

The Mine & Smelter Supply Co.
DENVER 17, COLORADO

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TSUBAKIMOTO CHAIN
Mfg. Co., Ltd.

620, Tsurumi-cho, Joto-ku,
OSAKA, JAPAN
Telegrams: TSUBAKI

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Other Books and Booklets

Barrier Pillars in the Lackawanna Basin, Northern Field, Anthracite Region of Pennsylvania, by S. H. Ash, B. S. Davies, W. M. Romischer, and H. E. Jenkins. USBM, Bulletin 517. $1, Supt. of Documents, Government Printing Office, Washington 25, D. C.

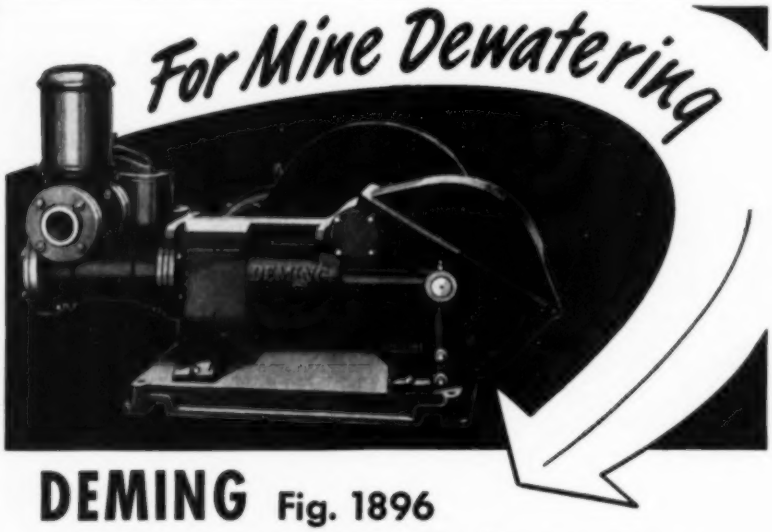
Gas Turbine Progress Report: Applications in automotive, railroad, aviation marine and central-station fields, with comments on new materials and trends. $1.50. American Society of Mechanical Engineers, 29 West 39th St., New York 18, N. Y.

The following USBM publications may be obtained free from the Publications Distribution Section, 4800 Forbes St., Pittsburgh 30, Pa. All are 8x10½-in; paper; mimeo.

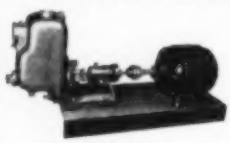
The Thermodynamics of Combustion Gases: Temperatures of Methane-Air and Propane-Air Flames at Atmospheric Pressure, by R. W. Smith, Jr., H. E. Edwards and S. R. Brinkley, Jr. R. I. 4938. 3 pp.

Fuels Consumed for Residential and Commercial Space Heating, 1935-51, by A. T. Coumbe and I. F. Avery. I. C. 7657. 10 pp.

Tests of the Anthratube, by J. F. Barkley, L. R. Burdick, and R. E. Morgan. USBM, R. I. 4936. 8 x 10½-in; paper; mimeo.



DEMING Fig. 1896
Double-Acting Mine Gathering Pumps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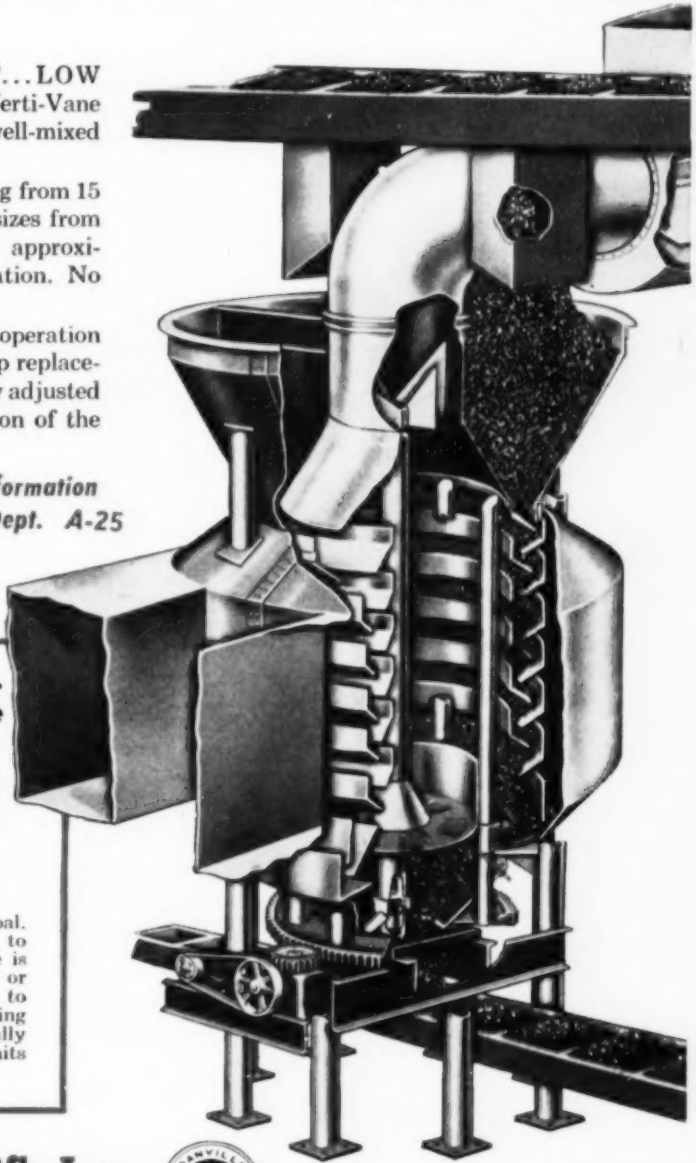

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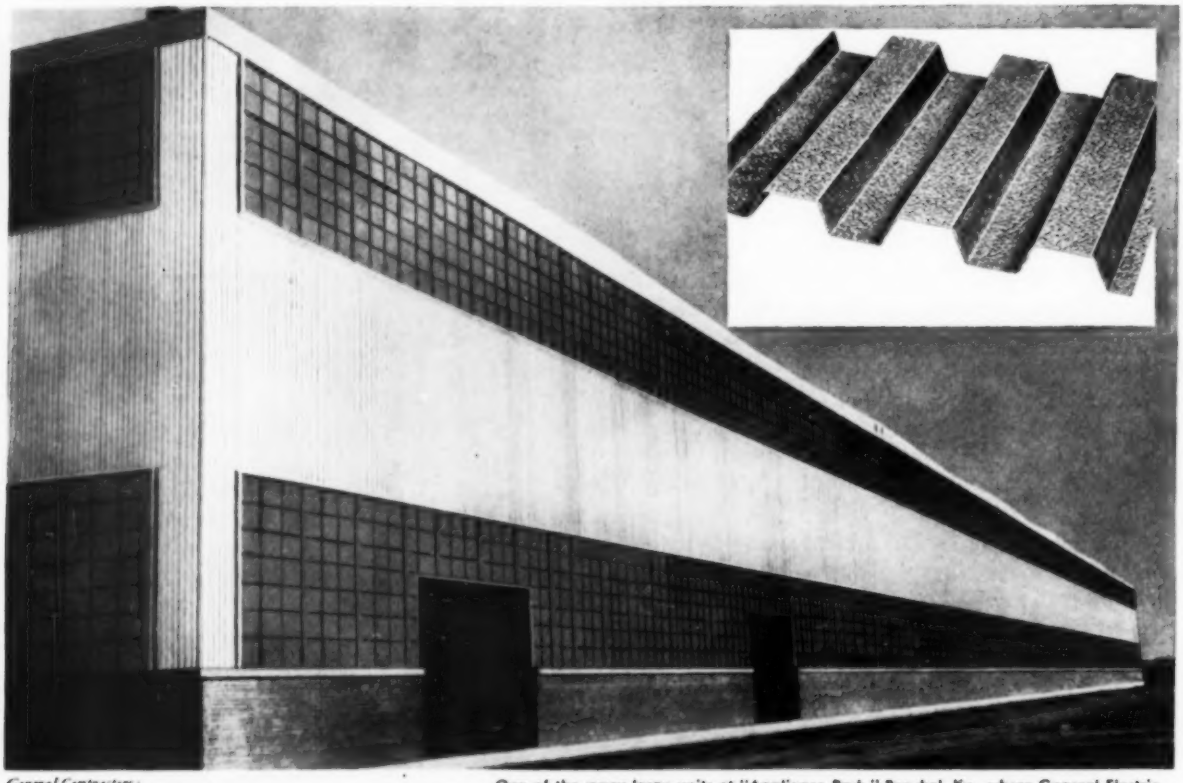
NOW...ALUMINUM INDUSTRIAL SIDING WITH MODERN ARCHITECTURAL BEAUTY!



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proves 12 times better

No. 360 Rotary Dry Rock Drilling Head Gives Amazing Results *in competitive test!*

The New No. 360 COALMASTER 6½" ROCKet HEAD equipped with COALMASTER No. 4T Expenda Bits. It can also be equipped with COALMASTER 4F or 4XLF hard-surfaced bits for less severe drilling at lower cost. Available in 6½" and 9" sizes.

PHOTO OF COMPETITIVE BITS

Unretouched photo of set of 7 tungsten carbide tipped bits from a well-known competitive rock drilling head after drilling only 6 feet in hard sandstone. Note how bits were either worn down to the head socket top or "mushroomed" beyond recognition. The head was so hot from friction it could not be touched for 30 minutes and was severely damaged by side and top "wash".

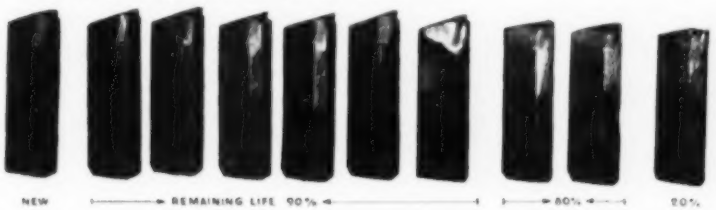

PHOTO OF COALMASTER BITS

Unretouched photo of 9 tungsten carbide tipped COALMASTER 4T Expenda Bits from the ROCKet HEAD after drilling 24 feet of extremely hard sandstone laced with pyritic bands in the same hole. Note that six of the bits had a remaining life of 90% or better; two were rated 80% or better. Only one was extensively worn; it had 15-20% useful life left and would normally be scrapped. The drill head itself showed only normal wear and was undamaged by friction heat caused by side or top "wash".

Performance speaks louder than claims . . . This test was held October 4, 1952 at a strip mine in western Kentucky with an overburden of 30 to 40 feet of extremely hard sandstone laced with pyritic bands . . . among the most difficult to drill in the entire Midwest. **The results reported herewith are supported by affidavits of a number of competent witnesses who observed the tests.**

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6. The shape and positioning of the bits, wedge and head sockets is such that bits cannot be lost.
7. Cost is about 30 to 35% less than that of comparable heads and it does a better job.

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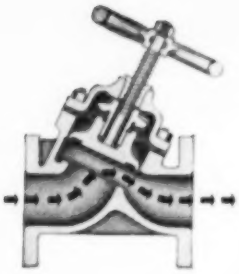

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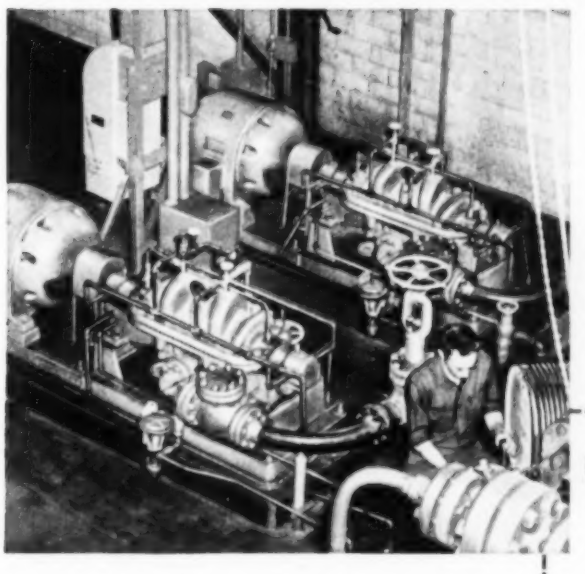

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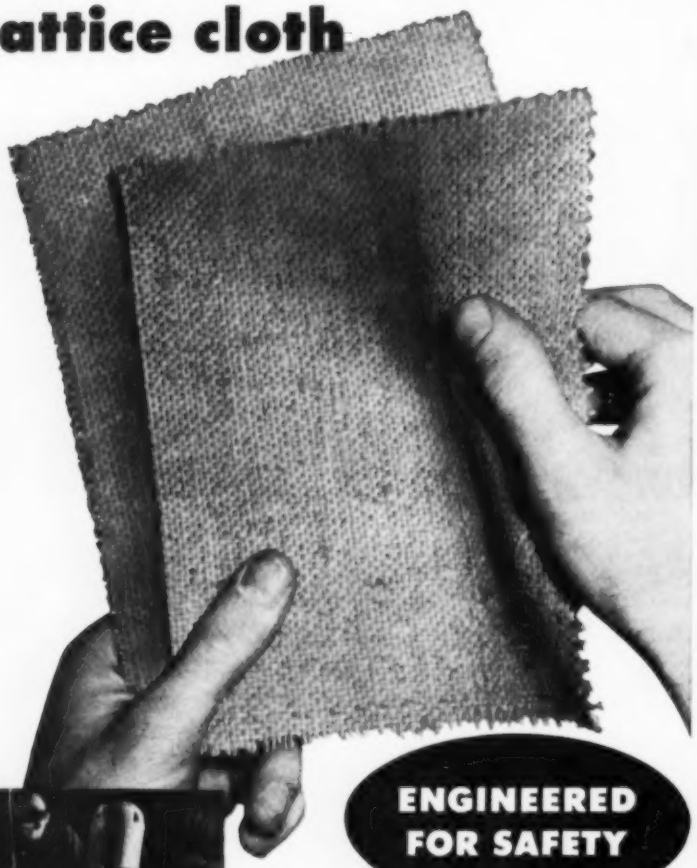

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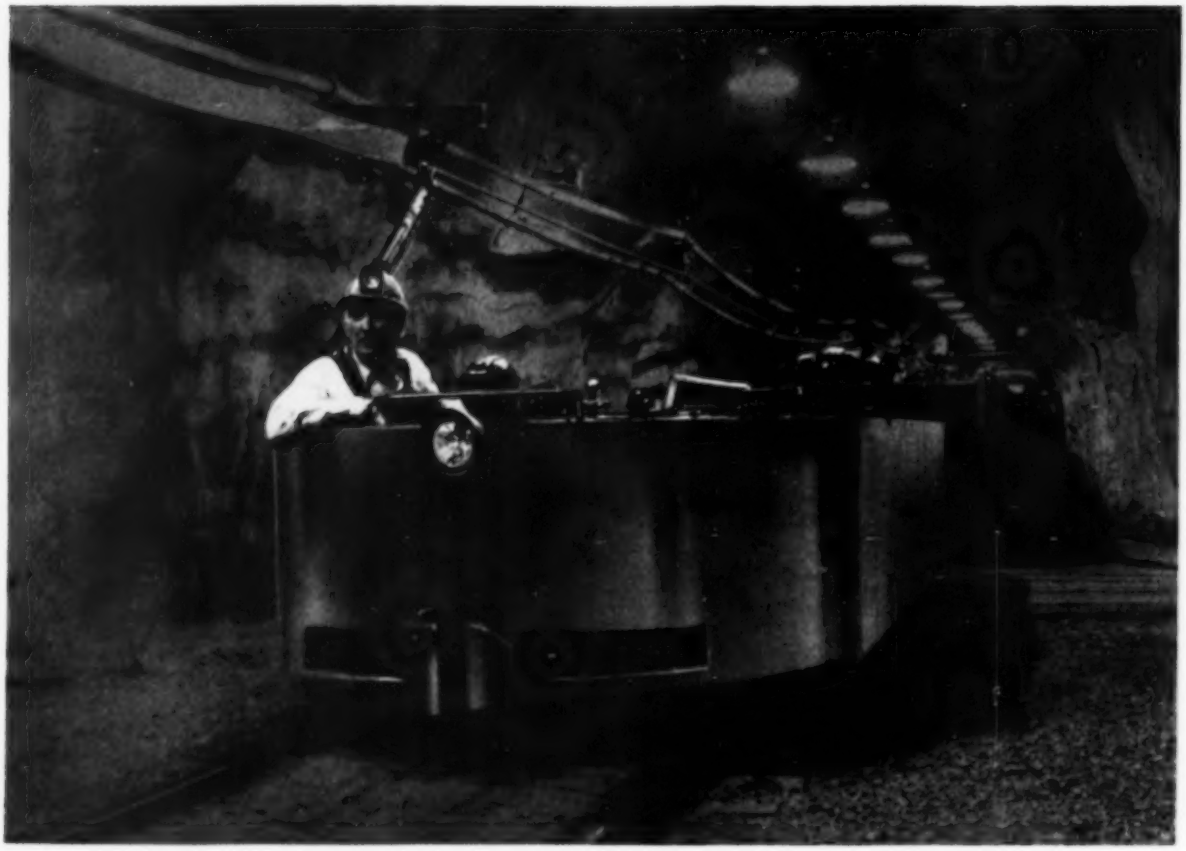

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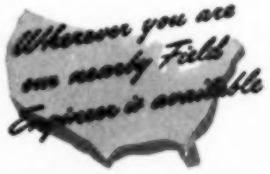

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Lee Norse 43 KMC shuttle car used little
Joy T-2 low pan Cat Truck.
Mancha Low Type Whippet X Battery Locomotive
Sullivan Super Shortwall 7-B 8½ ft. cutterbar D 13000 Caterpillar Diesel Engine A-1 cond.
75 K.W. & 150 K.W. 250-275 Volt generators de
above equipment in very good condition.
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REAL BARGAINS IN MINING EQUIPMENT
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2 Sullivan 11-B and 7-B, latest types.
7 Goodman 212AA, 112AA, 12AA.
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Shortwall, Arcwall & Slabbers.

COPPER TROLLEY & FEEDER WIRE—200 TONS
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1 Joy low pedestal 14 BU Loader.
1 Joy 8 BU Loader, 33½" high, rebuilt.
1 Jeffrey 61 CLR Loader, 24" high on rubber.
2 Myers Whaley No. 3 Automat Loaders.
2 Joy cable reel Shuttle Cars, rebuilt.
1 Joy T-2 low pan Cat Truck, like new.
5 Joy T-1 Caterpillar Machine Trucks.
6 Joy Ladel Shaker Conveyors. Excellent.
2 Joy Belt Feeders, PL-12.
5 Jeffrey 61 AM, 12' Room Conveyors, 300'
1 Joy 30" Underground Belt Conveyor, 500'
2 Goodman 97-C, 30" Belt Head & Tail Pcs.
2 Barber-Greene 24"x50" Portable Belt Conveyors.
1 Quickway Truck Shovel. Excellent.
1 Insley Crawler Shovel. Good Condition.

LOCOMOTIVES (all track gauges)
3 Jeffrey MH-78, 10 ton Locomotives, 2 in tandem.
10 Jeffrey MH-88, 6 ton Locomotives, 3 pr. in tandem.
(large stock of parts and supplies for above)
6 Goodman 6 ton, armor plate frames.
3 Westinghouse 904, 6 ton, bar steel frames.
(most of the above have motor driven reels)
1 gas 4 ton—2 Diesels 16 & 20 Ton.

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6—8000 Gallon Tank Car Tanks
5000 Five Gallon G. I. gas and water cans.
1 Brown Fayro Car Spotting Hoist.
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Relaying Rails, 400 tons, 20, 30, 40, 70 and 80 lbs.
Steel Mine Ties, 42", 44" & 48" Ga. 20#, 30#, 40# and 60#.
Coal Crushers, Wilmot & Pittsburgh.
1 Truck Tipple, 3 track, complete with coal washer, side tracks, truck scales, real estate.
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78 Drop Bottom, 48" Ga. 24" above rail.
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3 All steel Water Cars,
80 End Dump, 48" Ga., 30" above rail.
30 End Dump, 48" Ga., 20" above rail.
all steel.
20 End Dump, 42" Ga., 30" above rail.

POWER PLANTS
1 GMC Diesel, 75 KW, 275 Volts.
2 Superior Diesels, 100 KW, 275 volts.
1 Motor Generator, 150 KW, 2300-275 v.
4 Rotary Converters, 100, 150, 200, and 300 KW, 275 volts, 2300 and 6900 primary volts.

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114—SD Drop Bottom Mine Cars, 6 ton capacity, 42" gauge.
1—300 KW Rotary Converter, 275 DC, 2300 AC, A-1
2—200 KW Rotary Converters, 275 DC, 2300 AC, A-1
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1—Vulcan Gasoline Drive, 7½ ton Motor, 36"—42"—44"—48" Track Gauge. Rebuilt, four speeds ahead and four speeds reverse, all controls in cab, equipped with six cylinder Hercules rebuilt motor. Price—$3500.00 f.o.b. cars or truck, Scranton, Pa.

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We have recently purchased several complete coal plants and have available an excellent stock of all types of machinery. Below is just a partial listing of our complete stock of mining, electrical and industrial equipment.

LOCOMOTIVES

1—1½ ton Mancha "Trammer", 18" ga.
1—2 ton Whitcomb, battery, 24" ga.
1—4 ton Mancha, battery, 24" ga., with Edison batteries and charging set
1—4 ton Ironton, battery, 36" ga.
2—7 ton G. E. permissible battery, 36" ga.
1—7 ton Atlas, battery, 36" ga.
3—8 ton Ironton, 36" ga.
2—8 ton General Electric, battery 36" ga.
4—10 ton Atlas, battery, 36" ga.
1—3 ton Whitcomb gas engine driven, 24" ga.
1—2½ ton Jeffrey trolley, 36" ga.
1—4½ ton Goodman trolley, 36" ga.
1—5 ton Jeffrey trolley, 36" ga.
1—6 ton Goodman trolley, 36" ga.
2—8 ton Goodman trolley, 36" ga.

COAL CRUSHERS

1—24" x 24" Jeffrey Single Roll
1—24" x 36" McNally-Pittsburg Double Roll
1—30" x 45" Jeffrey Single Roll
1—30" x 16" Williams Pulverizer
1—36" x 40" Jeffrey Double Roll
1—36" x 48" Jeffrey Hammermill

TUGGER & SLUSHER HOISTS

2—5 HP Brownie Room Hoists
3—5 HP Sullivan RH single drum Room Hoists
1—7½ HP Sullivan double drum Slusher Hoist
2—10 HP Sullivan 3 drum Slusher Hoist
1—25 HP Sullivan 2 drum Slusher Hoist
1—Ingersoll-Rand Model 1H Air Tugger Hoist
1—Ingersoll-Rand Mod. 6HC Air Tugger Hoist
1—Ingersoll-Rand Model EU Air Tugger Hoist
2—6½ HP Sullivan Single Drum Air Tugger Hoist, 250 Volt DC
7—6½ HP Sullivan Double Drum Slusher Hoist, 250 Volt DC
1—Double Drum Sullivan Slusher Hoist Driven by Continental Gasoline Engine

ELECTRIC HOISTS

1—11 HP Vulcan #0 single drum
1—20 HP Vulcan single drum
1—22 HP Vulcan double drum
1—25 HP Vulcan single drum
1—30 HP Vulcan single drum
1—37 HP single drum
5—50 HP single drum
2—60 HP single drum
4—100 HP Box single drum
1—112 HP Vulcan single drum
1—145 HP Vulcan single drum
2—150 HP Vulcan single drum
1—375 HP Box single drum
1—600 HP Box single drum

BOX CAR LOADERS

2—Ottumwa 20 HP Box car loaders
3—Maniere 22 HP Box car loaders
1—Jeffrey 20 HP Box car loader

MINING MACHINES

2—7B Sullivan super short wall coal cutters
18—CE7 Sullivan coal cutters
1—CR3 Sullivan coal cutter
1—Jeffrey 28A coal cutter
6—Goodman 112-A coal cutters
1—Sullivan CH-11 ironclad shearing machine
1—Jeffrey 29-C Arcwall coal cutter

LOADERS & CONVEYORS

2—8BU Joy loaders
2—61EW Jeffrey elevating chain conveyors
1—61HG Jeffrey chain conveyor, 90'
1—61W Jeffrey chain conveyor, 200'
9—G-20 Goodman shaker conveyors
10—G-15 Goodman shaker conveyors
8—Vulcan shaker conveyors
2—Joy ladel UN-17 shaker conveyors
10—Goodman HA duckbills

MINE FANS & BLOWERS

2—8-H Jeffrey 42" Aerodyne Fans
1—Jeffrey 8 x 4 Fan
5—Jeffrey A61 exhaust blowers
8—Jeffrey Aerodyne midget blowers

SCALES

3—100 ton Fairbanks railroad scales
1—100 ton Howe railroad scale
1—125 ton Howe railroad scale
1—5000# Fairbanks Tipple scale with weighing basket
1—5000# Howe Tipple scale

STORAGE BINS

3—50 ton capacity steel bins
2—100 ton capacity steel bins

TIPPLE EQUIPMENT

1—4 deck shaker screen 32' long in 2 sections, driven by 10 HP & 25 HP motors
1—4 deck card shaker screen, 18' long, driven by 50 HP motor
1—Card rotary car dumper
1—Bucket Elevator, 36'6" centers, 18" x 11" x 9" buckets.
1—Bucket Elevator, 45' centers, 6"x4" buckets
1—Bucket Elevator, 48'8" centers, 10" x 6" buckets
1—Jeffrey picking table, 19' centers, 36" wide
1—Jeffrey picking table, 19'8", 36" wide
1—Jeffrey Drag Conveyor, 88'6", 36" flights
1—Jeffrey Drag Conveyor, 72', 30" flights
1—Jeffrey Drag Conveyor, 67', 30" flights
1—Jeffrey Drag Conveyor, 69'6", 28" flights
1—Link Belt Drag Conveyor, 50', 15" flights
1—32" x 9'6" Card vibrating screen
1—4' x 6'6" Link Belt jig washer
1—Loading boom, 32'3" centers, 24" flights with 8' grizzly
1—Loading boom, 55' centers, 48" flights
1—Loading boom, 45' centers, 30" flights
2—Card self dumping mine cages
2—Card 84" bicycle sheave wheels
1—24" Belt conveyor, 40' centers
1—24" Belt conveyor, 13' centers
1—24" Belt conveyor, 135' centers
1—24" Belt conveyor, 66' centers
1—30" Belt conveyor, 173' centers
1—Red Devil egg loader, 16" flights
1—Ottumwa nut loader, 16" belt

ELECTRIC CABLE

1368'—#10 Parkway cable 3/c, 7200 volt
2977'—#8 Parkway cable 3/c, 7200 volt
262'—#8 Parkway cable 3/c, 600 volt
1900'—#6 Parkway cable, 3/c, 7200 volt
970'—#2/0 Parkway cable, 600 volt
2,098'—#6 Tirex cable, 600 volt, 3/c
1417'—#4 Tirex cable, 3/c, 600 volt
547'—#2 Tirex cable, 3/c, 600 volt
1022'—#12 new Tirex cable, 4/c, 600 volt
5250#—300,000 CM stranded w.p. 1/c
14122'—#1/0 stranded r.c., 1/c
16682'—#4 stranded r.c., 1/c
2300'—#4/0 stranded r.c., 1/c
1705#—#4 solid bare
5467#—#2 solid bare
2600#—#1 solid bare
1255#—#1/0 solid bare
2975'—type TTHFA-60 new telephone cable

PIT CARS

160—60 cu. ft. coal mine cars, wooden sides, 42" ga.
125—60 cu. ft. Card steel coal mine cars, 36" ga.
88—66 cu. ft. Card steel coal mine cars, 36" ga.

SHUTTLE CARS

2—Joy Shuttle Cars, Model 42D5.

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MOTOR GENERATOR SETS

400 KW West., 550 v. 720R-Syn.-SK 2300/4000 v.
2—300 KW West., 275 v. 1200R-Syn. 2300 v.
300 KW G.E. 275 v. 1200R-MPC-ATI 2300/4000 v.
300 KW Ridg. 275 v. 1200R-Syn. 2300 v.
300 KW West. 550 v. 1200R-Syn.-SK 2300 v.
300 KW West. 275 v. 1200R-SK.CW 2300 v.
200 KW G.E. 275 v. 1200-MPC-ATI 2300/4000 v.
200 KW Ridg. 275 v. 900R-Syn. 2300 v.
200 KW West. 275 v. 900 R. SK-Syn. 2300 v.
200 KW G.E. 125 v. 1200 R MPC-ATI 2300/4000 v.
150 KW G.E. 275 v. 1200 R. MPC-ATI 2300/4000 v.
150 KW West. 275 v. 1200R-Syn.-SK 2300 v.
150 KW G.E. 550 v. 900 vR-DLC-ATI 2300/4000 v.
100 KW Ridg. 275 v. 1200R-Syn. 2300 v.
35 KW G.E. 125 v. 1750 R. RC-KT 220/440 v.
15 KW Ideal 125 v. 1750R. D-A 220/440 v.

LOCOMOTIVES AND CUTTING MACHINES

20 Ton Jeff 250 v. 44" Ga. MH77
13 Ton Jeff 250 v. 36/48" Ga. MH110
10 Ton Jeff 250 v. 36/48" MH110
8 Ton Goodman 250/550 v. 42"/44" ga.
6/7 Ton Jeffrey Battery 42" ga.
6 Ton Westgh. 250 v. 36" Ga. 904
2—6 Ton G.E. 250 v. 28½" ga.
4—5 Ton Goodman 30B 250 v. 42/44"
35 B Jeff. 250 v. Permissible
35 BB Jeff. A.C. Permissible
3—12A Goodman Shortwall 50HP Motor 250 v.

ROTARY CONVERTERS

2—500 KW G.E. 275 v. HCC6-1200R, 13,200 v.
400 KW West 275 v. 1200R, 13,860/2200/4000
300 KW G.E. 275 v. HCC6-1200R, 2300/4000 v.
300 KW G.E. 275 V. HC12-600 R, 2200/4000
200 KW G.E. 275 v. HCC6-1200R, 2200/4000 v.
150 KW G.E. 275 v. HCC6-1200R, 2200/4000 v.
Will rewind transformers to your specifications.

AC MOTORS

HP	MAKE	SPEED	TYPE	WDG.
400	G.E.	450	IM	S.R.
300	G.E.	450	MT	S.R.
150	G.E.	600	ATI	Syn.
2—100	G.E.	450	IM	S.R.
100	West.	900		Syn.
100	West.	1200	CS	S.C.
75	West.	900	CS	S.C.
50	G.E.	1750	KT	S.C.
50	G.E.	900	KT	S.C.
40	G.E.	900	M.T.	S.R.
30	G.E.	900	KT	S.C.
30	G.E.	1200	KT	S.C.
20	West.	1200	CS	S.C.
15	West.	1750	CS	S.C.

Many smaller units in stock.
Also 230 V. DC Motors Rated 200-125-75-60-30-10 HP.

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5—13 ton Jeffrey MH-110, 250 D.C. 42" Ga.
1—20 ton Jeffrey MH-110, 250 DC, 42" Ga.
3—6 ton Jeffrey MH-100 250 DC 42" ga.
6—6 ton Jeffrey MH-88
4—6 ton Mancha Battery Type 48 cell, C-61-6 mtrs 42" ga.
8—13 ton G.E. 42" ga.
20—6 ton Goodman, 42" ga.
3—8 ton Goodman, 42" ga.
3—15 ton Westinghouse, 42" ga.
8—5 ton GE Battery, 36" ga. (with batteries)
5—5 ton Mancha Battery, 36" (with batteries)
2—12 ton Jeffrey, 42" ga.
2—12 ton GE, 42"
6—5 ton GE Battery, 42"
2—12 ton Goodman, 42" ga.

LOADING MACHINES

25—Joy Loaders, 250 DC, 42" ga. 7 & 5 BU
2—Joy Continuous Miners, 250 DC

CUTTING MACHINES

10—Goodman Shortwall Cutting Machines

COAL DRILLS

17—Chgo-Pneu. post mtd'd coal drills, AC & DC
50—Type 473 Denley Bros. Elec. Coal Drills

MINE & SHUTTLE CARS

150—4 ton steel mine cars, 42" ga. 'E dump
25—Joy shuttle cars, 42D
200—3 ton 42" ga. ACF Mine cars, Timkes
200—2½ ton ditto
10—Charging panels for shuttle car batteries

GENERATORS

1—2000 KVA Westinghouse 2400 V generator, comp.
1—1500 KW Allis Chalmers 2400 V Generator, comp.
1—750 KVA GE
2—150 KW Westinghouse MG set 2300 V.
1—300 KW GE
1—75 Westinghouse MG set

CONVEYORS

1—36" GA Conveyor with 150 HP drive, 2000'
6—Joy Elev. conveyors, type PL-11-2E

CAR SHAKEOUT & HOISTS

1—6 ton heavy duty L.B. car shakeout with 8 ton elec. hoist for 220/440
1—Hewitt-Robbins heavy duty Shakeout A.C.

TIPPLE

1—6 track tipple comp. with shaker & boom

MINE AND SLOPE HOISTS

3—12000# Wellman Sgl Drum 4'x5' F hoists with 150 HP motors, starters, safety control, 250 V DC
1—10000# Clyde DC
1—28,000# Nordberg Sgl Drum
1—11,000# Wellman Sgl Drum AC
1—7,000# Ottumwa Sgl Drum AC

CARPULLERS AND LOADERS

1—10,000# Link Belt Capstan Carspotter new
1—5,000# Jeffrey Carspotter AC
1—5,000# Link Belt Carspotter AC
1—20,000# Amer. Hoist Carspotter AC
1—20,000 LB Endless puller

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1—36x36 Jeffrey Sgl Roll
1—12x16 Eagle Dbl Roll
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1—420' x 20" SA Comb. Scraper & Bucket Conveyor or w/o Mtr. Ideal for tipple or dock.
2—24"x80' SA Porta. conveyors AC motor
1—(New) Nolan Porta-Feeder
4—Joy Caterpillar T-1E Mining Machine Trunks

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COAL MINING EQUIPMENT

LOCOMOTIVES
48" Gauge — 250 Volts

2—Westinghouse 904— 6 Ton
2—Westinghouse 58— 8 Ton
1—Goodman 10A—10 Ton
1—Westinghouse 65— 8 Ton
1—Jeffrey —10 Ton
1—General Electric —15 Ton
1—Westinghouse 907—10 Ton
1—Westinghouse 906— 8 Ton

DRILLS

13—Jeffrey A-7 Hand Held—250 Volts
9—Chicago Pneumatic 571—Hand Held—250 Volts
4—Jeffrey A-6 Post Mounted—250 Volts
2—Chicago Pneumatic 574 Post Mounted—250 v.
1—Cleveland 511S Stoper Drill

CONVEYORS

2—Goodman G-20 Drives—250 Volts
8—Goodman E-11 Units—Complete—250 Volts
5—Goodman G 12½ Units Complete—250 Volts
3—Jeffrey 52 B—26" Belt Conveyors—Complete

MINING MACHINES

12—Goodman Standard Shortwalls—250 Volts
10—Goodman Universal Shortwalls—250 Volts
All Mining Machinery with 7½ Ft. Cutterbars, spare parts.

LOADERS

2—Jeffrey L-400—44" Track Gauge—250 Volts with Spare Parts

HOISTS

1—American Hoist & Derrick Co. Single Drum Hoist with 15 H.P. Motor
1—Vulcan Hoist—Single Drum with 60 H.P. Motor

MISCELLANEOUS

1—MSA Rockduster—250 Volts, Permissible — Pneumatic Tires with 48" Gauge Track Truck
4500'—7/8"—6x7 Imp. Plow Hempcenter Wire Rope
1—Howe Met—10 Ton Mine Car Scale
1—Howe Weightograph
1—TIC-P3E Joy Caterpillar Mining Machine Truck 250 Volt Permissible Plate
Rail—40 and 60# Relaying Rail
Electric Feed Cable
4/0 and 6/0 Trolley Wire

SPECIALS
6 SC Shuttle Cars & Loaders
100 & 150 kw diesel-gen. units
SUBSTATIONS
275 Volts DC
2300/4000Y or 6900/12000Y Pri.
ROTARY CONVERTERS
150, 200, 300 & 500 Kw — 275 VDC
300, 500, 750 Kw — 600 VDC
SELENIUM RECTIFIERS
50 Kw, 100 Kw, 150, 200 & 300 Kw
MERCURY ARC RECTIFIERS
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New 500 Gal. Skid Mounted STORAGE TANKS
Shell of ⅛" Steel, 2" Outlet and 12" Manhole in Top.
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2 TELEPHONES $25.95

Inter-communication handsets, two wire system. Included Two 3 volt batteries, 50 ft. of wire and simple wiring instructions. Additional wire 1 cent per ft. or $25.00 per mile. Complete list of telephone parts, handsets, magneto—common battery—and dial telephones, switchboards, etc. Write:
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150 SETS SANFORD-DAN MINE CAR TRUCKS. 44" x 16", ROLLER BEARINGS.
$55.00 PER SET F.O.B.
AMERICAN COMPRESSED STEEL CORP.
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WIRE ROPE
2—1,250 Ft. Pcs. 1-5/8" Roebling Locked Smooth Coil Track Strand Wire Rope for Aerial Tramway. NEW—NEVER USED. Apply to THE SNAP CREEK COAL COMPANY, P.O. Box No. 1029, or Tel. 1533, Logan, West Virginia.

NEW and REBUILT STORAGE BATTERY
LOCOMOTIVES
1½ to 10 Tons 13" to 54" Track Gauge.
GREENSBURG MACHINE CO.
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Ironton Electric Locomotives
New and used.
The Ironton Engine Company
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VARIABLE SPEED DRIVES
FREQUENCY CHANGERS
LOW-VOLTAGE GENERATORS
American ELECTRIC CORPORATION
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For Sale!

1500 PIECES — UNUSED

Steel

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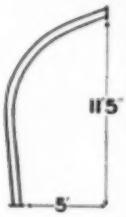

Specifications: 6" H, 20 lb. per ft. C.M.P. not required

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One (1) Fairbanks-Morse single stage, centrifugal pump, 30-inch bottom suction, 24-inch horizontal discharge, 5843 NE, rated approximately 25 m.g.d. at 210-foot head, 720 R.P.M., directly connected to a Fairbanks-Morse Synchronous motor, 1250 H.P., 720 R.P.M., 3 phase, 60-cycle, 13,200-volts.

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10 LARGE CENTRIFUGAL PUMPS

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WHY WAIT

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STRONG CARCASS—Constructed of finest quality 28 and 32 ounce tough cotton duck, properly treated and impregnated to avoid mildew from moisture and atmospheric conditions. Each ply thoroughly embedded in rubber to prevent ply separation.

FLEXIBILITY — Careful attention has been given in the construction of all belts to have the proper flexibility assuring the following desirable features: troughs easily, runs true on all idlers, gouge resistant, excellent for long and short hauls and slope installations.

Avoid delays in your production schedules!

We carry in stock for your immediate requirements, Conveyor Belting in widths from 8 inches to 48 inches

Width	Ply	Thickness Top Cover	Thickness Bottom Cover	Type of Duck Carcass
8"	4	1/16"	1/32"	28 Oz.
10"	4	1/16"	1/32"	28 Oz.
12"	4	1/16"	1/32"	28 Oz.
14"	4	1/16"	1/32"	28 Oz.
16"	4	1/8"	1/32"	28 Oz.
18"	4	1/8"	1/32"	28 Oz.
20"	4	1/8"	1/32"	28 Oz.
20"	5	1/8"	1/32"	28 Oz.
24"	4	1/8"	1/32"	28 Oz.
24"	5	1/8"	1/32"	28 Oz.
26"	5	1/8"	1/32"	28 Oz.
30"	4	1/8"	1/16"	32 Oz.
30"	5	1/8"	1/16"	32 Oz.
30"	6	1/8"	1/16"	32 Oz.
36"	6	1/8"	1/16"	32 Oz.
42"	5	1/8"	1/16"	32 Oz.
48"	5	1/8"	1/16"	32 Oz.
48"	8	1/8"	1/16"	32 Oz.

INQUIRE FOR SIZES NOT LISTED. ELEVATOR TRANSMISSION & V-BELTING ALSO IN STOCK.

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3-roll Troughing Idlers for these sizes:

14" belt	$16.50	24" belt	$18.75
16" belt	17.25	30" belt	19.50
18" belt	18.00	36" belt	20.25
42" belt	$21.00		

1-roll Return Idlers for these sizes:

14" belt	$6.38	30" belt	$8.25
16" belt	6.75	36" belt	8.75
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All steel. Interchangeable with other well known makes. replaceable ball bearings. Rust-proof ball races; maintenance is negligible.

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18"	4	1/16"	1/32"	28 oz.	2.50/ft.
24"	4	1/16"	1/32"	28 oz.	3.23/ft.
30"	4	1/8"	1/32"	28 oz.	3.97/ft.
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48"	6	1/8"	1/32"	28 oz.	6.16/ft.

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Complete with motor and drive. 15 to 225 tons per hour capacity. Priced from $423.00

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20 Ton Truck Scales	$525.00
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Others to 50 ton capacity. All scales complete with structural steel. Parts and weighing beams for most makes of motor truck scales.

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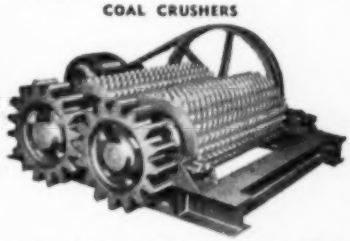

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SINCE 1912 **CINCINNATI 27, OHIO**

NEW HORSEPOWER!
NEW BRAKING POWER!
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Biggest truck values of the year! New, just-announced Dodge trucks with features like . . .

7 high-compression engines, with 100 to 171 horsepower, give you more ton-miles per hour, more deliveries per day! New styling inside and out, tough new floors in pick-up and panel bodies, new tighter-than-ever tailgates on pick-ups and expresses! A total of more than 50 brand-new features to boost truck earning power!

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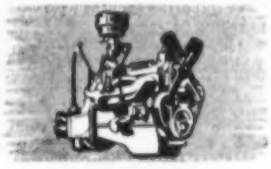

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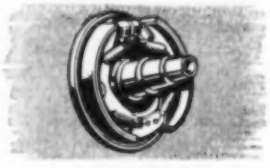

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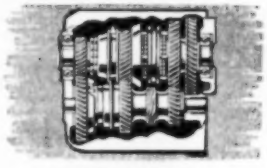

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OVER 50 FEATURES!

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. . . is first choice in the field of mining . . . because . . .

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- It's guaranteed not to dry out
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IT'S PORTABLE!
Easily transported from job to job and set up for use in minutes.

Capacities:
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REMOVABLE SIDE ARMS
The assembled scale can be moved by merely removing six bolts which hold the side levers in place. The complete scale can then be lifted as a unit and loaded onto a truck. Once positioned, it can be ready for use in minutes.

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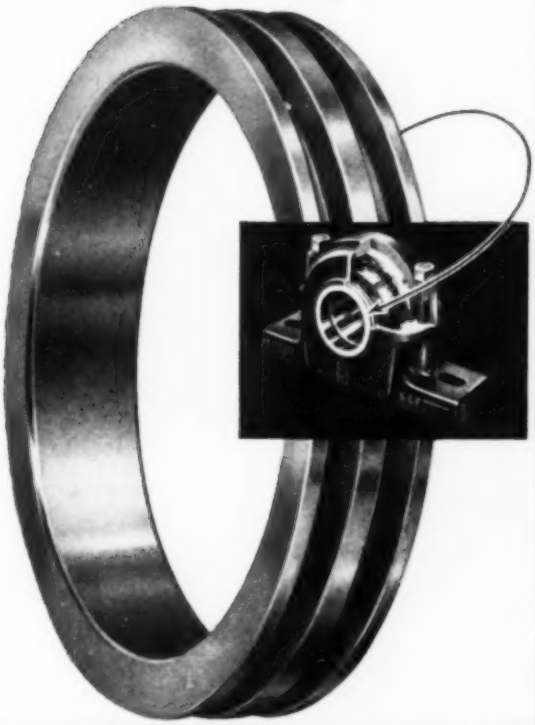

Here's why SKF Triple-Seal "SAF" Pillow Blocks are your solution:

- SKF Triple-Seal "SAF" Pillow Blocks are easy to install and inspect.
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BALL AND ROLLER BEARINGS

IN MINES IT'S
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BECAUSE:
This outstanding plastic pipe outlasts old-fashioned metallic pipe. By its very nature, it is completely resistant to the effects of sulphurous waters, alkalies, metallic salts and other wastes which quickly corrode metal pipe.
CARLON can be handled easily and installed fast by one man . . . requires minimum number of fittings. Recommended for drinking water and drainage systems, ventilating lines, hydraulic sluicing, intake and exhaust piping, etc.
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CARLON IS FLEXIBLE
EVERY FOOT IS FACTORY-TESTED
STRIPED FOR POSITIVE IDENTIFICATION
LENGTHS UP TO 400 FEET
GUARANTEED AGAINST ROT, RUST AND CORROSION
SMOOTH INNER WALLS CUT FRICTION LOSS
IT'S LIGHTWEIGHT

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Buy the Pipe with the Stripe!

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CARLON PRODUCTS CORPORATION

Pioneers in Plastic Pipe

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CANADA: Micro Plastics, Ltd., Acton, Ontario EXPORT: H. E. Botzow, New York City

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● The rock floor of this limestone quarry, nearly a hundred feet below ground level, presents a constant drainage problem.

Men and equipment must be free to work around the clock in any kind of weather . . . free to work despite rain squalls, spring thaws or the gradual seepage of surface water through the overburden.

And, since the work location shifts as each load of stone is removed, the drainage facilities must be able to move with the shovels.

Getting the water off is a job for hose . . . a tough, flexible water carrier that can be dragged over abrasive surfaces, subjected to falling rock, snaked into out-of-the-way crevices and lengthened or shortened at the turn of a coupling.

The Bessemer Limestone Company, a Republic Rubber customer for more than a generation, uses Republic's Water Hose for this purpose.

They use Republic Hose because it stands up better, handles easier, lasts longer on the job.

Water Hose is just one of Republic's complete line of Industrial Rubber Products that is quality built and sold through Republic Distributors who are experts in their job of helping you select and apply the right hose or belt for your specific job.

Your Republic Distributor is ready to make a complete, free analysis of your requirements now. Contact him or write us today for full facts on how this analysis results in better performance, better service and less costs for you on the job.

REPUBLIC RUBBER DIVISION

LEE RUBBER & TIRE CORPORATION, YOUNGSTOWN 1, OHIO

INDUSTRIAL RUBBER PRODUCTS

How to keep informed on the "with what" part of your business

AT YOUR FINGER TIPS, issue after issue, is one of your richest veins of job information—advertising. You might call it the "with what" type—which dovetails the "how" of the editorial pages. Easy to read, talking your language, geared specifically to the betterment of your business, this is the kind of practical data which may well help you do a job quicker, better—save your company money.

Each advertiser is obviously doing his level best to give you helpful information. By showing, through the advertising pages, how his product or service can benefit *you* and *your* company, he is taking *his* most efficient way toward a sale.

Add up all the advertisers and you've got a gold mine of current, on-the-job information. Yours for the reading are a wealth of data and facts on the very latest in products, services, tools . . . product developments, materials, processes, methods.

You, too, have a big stake in the advertising pages. Read them regularly, carefully to keep job-informed on the "with what" part of your business.

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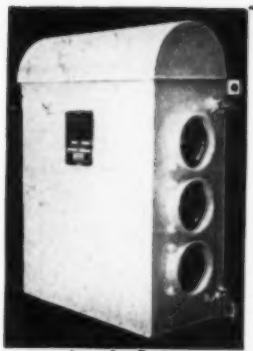

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Save Trip Time on Main Haulage
Prevent Collisions

A two wire cable connects two or more signals together into one block. Only one signal can show proceed on the entrance of a trip, all other signals show stop.

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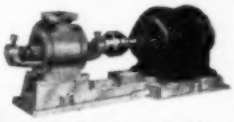
Better on "1001" Pumping Duties

Capacities to 150 G.P.M.



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Apco—the pump with but one moving part, the impeller — is famous for long-lived, efficient performance on small capacity, high head duties. Available in Single Stage, Two Stage and 4-Stage Tandem for high pressures — and Water Jacketed for high temperature and highly volatile liquids.

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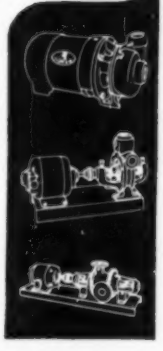

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Exploration for coal and other mineral deposits. Foundation test boring and grout hole drilling for bridges, dams and all heavy structures.
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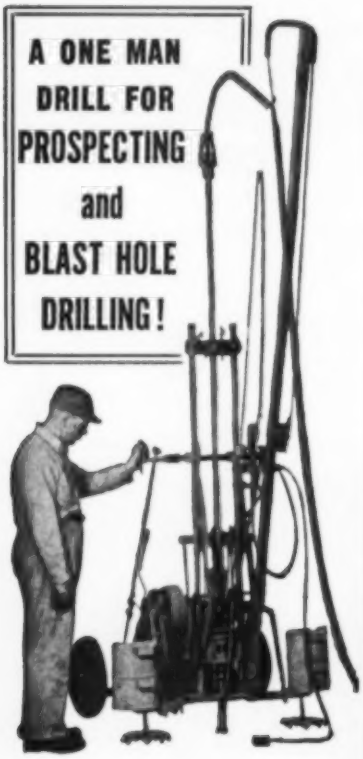

THIS HOSSFELD ROCK DRILL

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- **POWERFUL DIRECT DRIVE**
- **ONE MAN OPERATION**
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BLAST HOLE DRILLING can be done faster and better, too. Holes are full diameter all the way. Drills at any angle from vertical to horizontal.

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BELT FASTENER No. 500

for
Conveyor Belts

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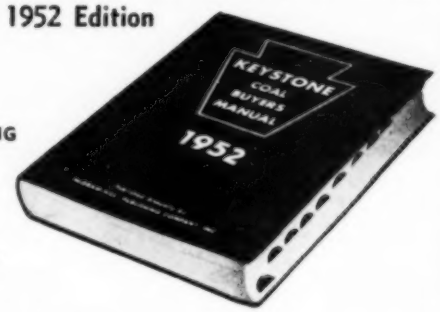

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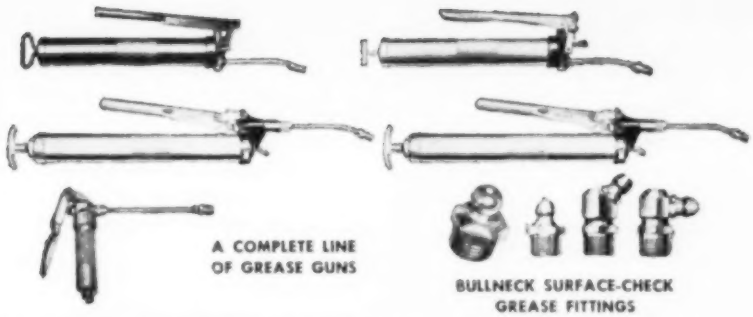

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BULLNECK SURFACE-CHECK GREASE FITTINGS

100-LB. AND 400-LB. DRUM PUMPS AIR MOTOR OPERATED

You Reduce Bearing Failures, Downtime and Operating Costs...

When You *Apply the Right Lubricant in the Right Quantity at the Right Time* with *Lincoln* LUBRICATING EQUIPMENT

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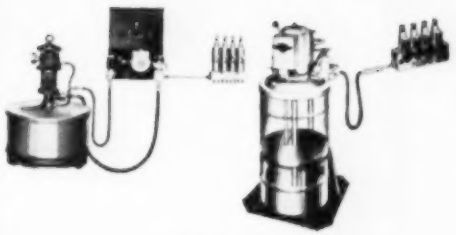

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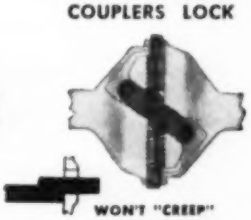
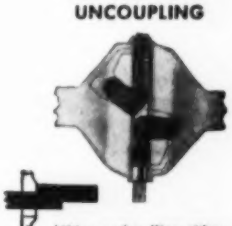


WON'T "CREEP"
As pivoted locks swing into engagement, each control bar drops to lock against the flange of opposite head.

LOCK-SET FOR UNCOUPLING



Lifting and pulling either control bar unlocks the coupler and holds lock in lock-set position until heads move apart.

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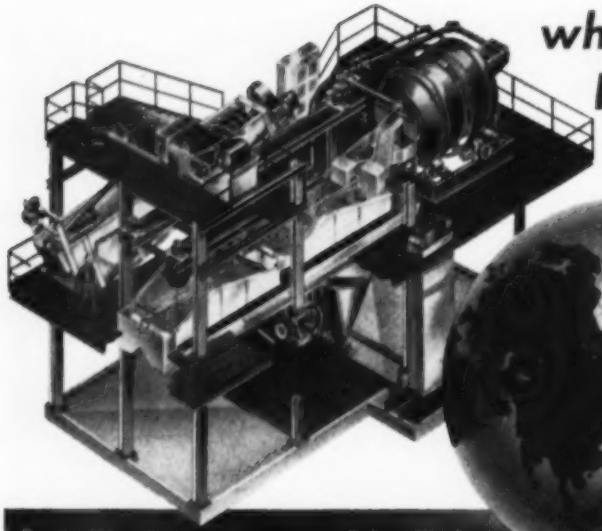

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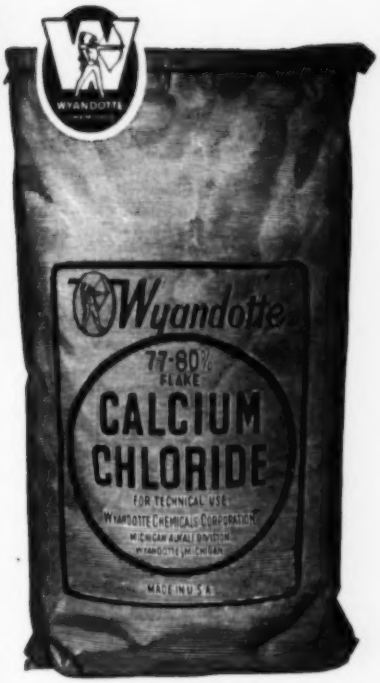

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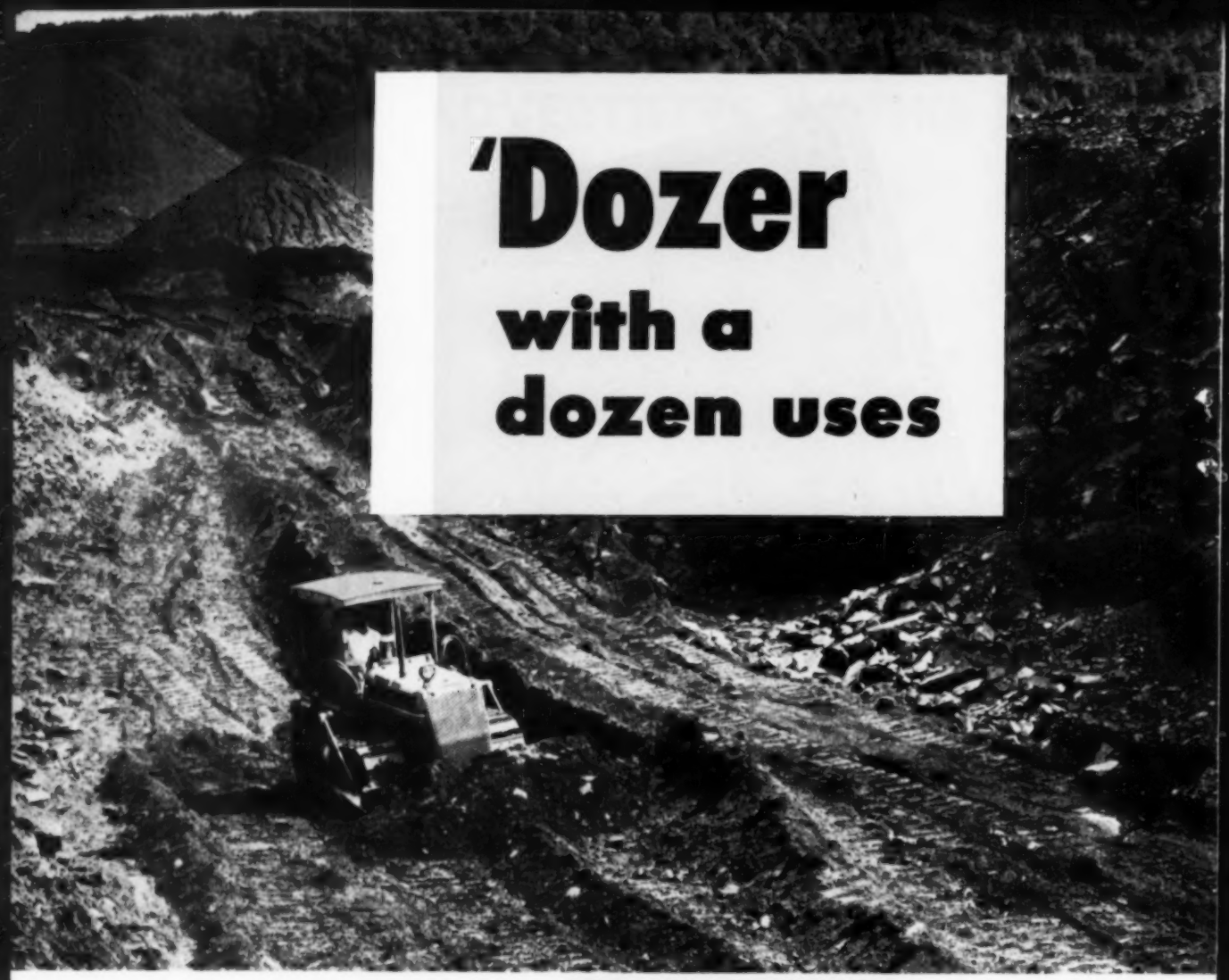
'Dozer with a dozen uses



Any Caterpillar 'Dozer will more than pay its way around a mine. This D2-No. 2A Bulldozer used by Michael Stefero in reclaiming bank coal at Boston Run, Pa., is a good example.

Smallest bulldozer unit in the Caterpillar line, the D2-No. 2A is built with the same rugged strength as its big brothers, and powered by the same type of dependable Cat Diesel Engine.

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TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

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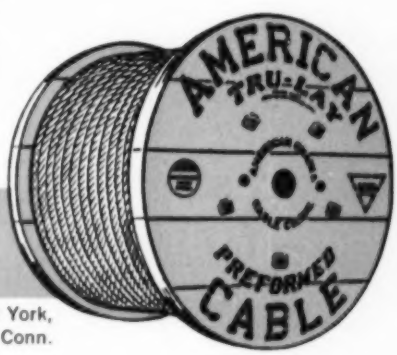
The one best wire rope . . . TRU-LAY Preformed . . . will last you longer and cost less to use. Specify and get TRU-LAY Preformed improved plow steel—the rope identified by the Green Strand.



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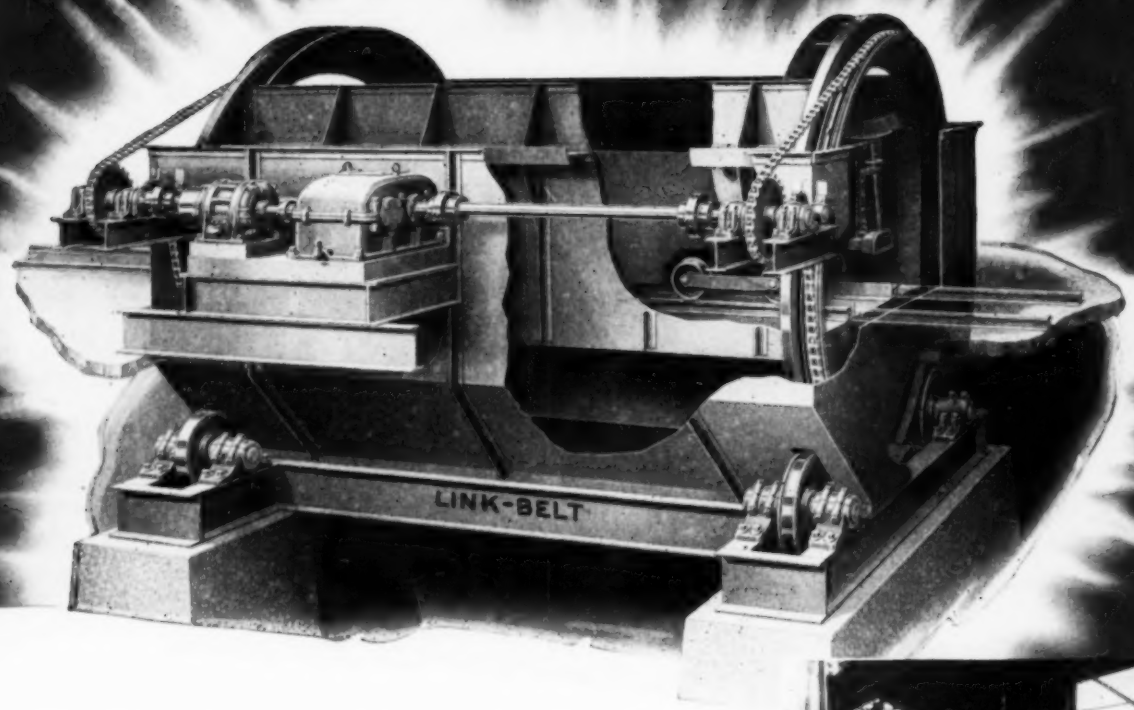

Handles all sizes and types of mine cars suitable for rotary dumping

Where there is excessive moisture—when coal is mined from a wet seam or sprayed to keep down dust—the Link-Belt *Positive-Drive* Rotary Mine Car Dumper saves time and cuts your unloading costs.

This chain-driven dumper supplements Link-Belt's traction type. Both dumpers can be adapted to widely varying conditions. Both are built for full 360 degree rotation, and both will handle one or more cars, in train if desired. Regardless of the type of car, shockless, gentle handling and fast, automatic operation are assured.

To find out how you can speed car handling with fewer man-hours per ton, call the Link-Belt office near you. And, remember, car dumpers are only a part of the complete range of coal handling and preparation machinery engineered and built by Link-Belt.

Link-Belt car haul, automatic spacing equipment and rotary car dumper are automatically coordinated for fast, smooth weighing, stopping and dumping.

LINK-BELT

COAL PREPARATION and HANDLING EQUIPMENT

LINK-BELT COMPANY: Chicago 9, Philadelphia 40, Colmar, Pa., Pittsburgh 13, Wilkes-Barre, Huntington 9, W. Va., Louisville 2, Denver 2, Kansas City 8, Mo., Cleveland 15, Indianapolis 6, Detroit 4, Birmingham 3, St. Louis, Salt Lake City 1, Seattle 4, Toronto 8, Springs (South Africa), Sydney (Australia). 12.580-A